# ARCHIVES OF OTOLOGY.

## THE CENTRAL ACOUSTIC TRACT AND ITS INVOLVEMENT BY TUMORS OF THE MID-BRAIN, ESPECIALLY OF THE CORPORA QUADRIGEMINA AND THE TEGMENTUM (*Continued*).

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### 5.—ELEVEN CASES OF QUADRIGEMINAL (TEGMENTAL) TUMORS WITH CONSECUTIVE DEAFNESS. (Abridged translation.)

DEAFNESS occurs as a symptom of a quadrigeminal tumor in twenty of our cases, *i.e.*, about 34.5 %. In this number are included seventeen of the forty-eight cases of combined involvement of the pineal body and the corpora quadrigemina, and three of the ten cases of tumors limited to the pineal body. If the rare cases of cortical deafness be disregarded, no lesion in any other region of the brain is so frequently accompanied with deafness as are the tumors of the mid-brain. Bernhardt noted eight cases of deafness in thirty cases of tumors of the pons, while Delbanco found deafness eleven times in forty-six cases; together we have nineteen cases of deafness in seventy-six, about 25 %. In tumors of the cerebellum, according to Bernhardt, the number is smaller, about 20 %, while deafness in affections of other parts of the brain is much rarer.

The selection of permissible cases for our statistics was not so simple as might seem. We first rejected all cases of external and middle-ear disease. Of the remaining, we could only make use of those where (1) the deafness coincided with or immediately preceded a symptom referable to the brain tumor, and where (2) the deafness showed a marked progressive character. Consequently we have been

forced to exclude from our twenty cases of deafness in quadrigeminal affections nine cases where the time of onset of the deafness was not stated, and the progressiveness of the deafness was not proven.

ELEVEN CASES OF DEAFNESS OF PROGRESSIVE CHARACTER AND COINCIDENT WITH THE BRAIN-AFFECTION.

1. WAGNER (4), female, twenty-seven years old. Duration of sickness, four and one-half months. Increasing deafness from third month on. At first, occasional attacks of syncope, preceded by tinnitus and spasms in the extremities. After attacks, patient is often deaf for several hours ; complete deafness after the fourth month. Neuritis optica, later atrophy and blindness. Delirious at times.

*Autopsy.*—Corpora quadrigemina indistinguishable. The tumor, a resistant, fibrous tubercle, extends from the corpora quadrigemina into the depth of the pons. The latter contains two small apoplectic foci, otherwise normal ; corpus striatum and optic thalamus normal.

2. KLEBS-FISCHEL (10), male, twenty-two years. Duration, seven months. The left ear became deaf six months after beginning of disease. A month later complete deafness on right side. Blindness. Eyes converge. Argyll-Robertson pupil. Ptosis. Tremor, ataxia. Vomiting. Headache. Excited. Suicidal tendency.

*Autopsy.*—4–6 *cm* large glioma of quadrigeminal region, of both crura, and the post. cerebellum. Metastases in floor of fourth ventricle.

3. GOWERS (11), male, twenty-four years. Duration about two months. A month after beginning, complete deafness within eighteen days. Choked disc, optic neuritis, diminished vision. Stupor.

*Autopsy.*—A sarcoma between the healthy optic thalami, above the crura and in front of the superior corpora quadrigemina, which are likewise involved. Pineal body has disappeared ; the left lower corpus quadrigeminum is flattened, the right is normal. The dorsal layer of the tegmentum of both crura is affected in the lateral portion. The tumor sinks somewhat into the Sylvian aqueduct. The trunks of the eighth nerves are normal, but the sixth nerves are compressed.

4. HOPE (22), male, eighteen and one-half years. Duration of sickness six months. After three months marked deafness in right side. Left, hearing somewhat diminished. Tuning-fork placed on skull is perceived in left ear. Two weeks later, increasing deafness left, though deafness does not become complete on either side. Optic neuritis, diminished sight. Argyll-Robertson pupil. Ocular motility up and down restricted. Paresis of vagus and spinal accessory. Tremor. Convulsions. Apathetic.

*Autopsy.*—A tumor (sarcoma telang.) as large as a pigeon's egg occupies the quadrigeminal area, and compresses the optic thalami. Sylvian aqueduct remains in the posterior half, the anterior part is destroyed. Left posterior corpus quadrigeminum present though swollen, and its brachium is broadened. The roots of the second cervical nerve are contained in a sclerosed area.

5. GAUDERER–STEINBRÜGGE (24), male, twelve years. Duration, two months. R. otitis ext. L. drum-membrane opaque. Watch heard only contact R; L. in several centimetres (normal 10 *m.*) Tuning-fork a′ not perceived from the forehead, but from each mastoid process. Optic neuritis with deficient sight. Myosis; pupils do not react. Sensibility is reduced, later hyperæsthesia. Ataxia. Speech retarded. Stupor.

*Autopsy.*—A tumor (teratoma) of the size of a walnut, of the pineal body with extensive erosion of both median surfaces of the optic thalami and of the left tegmental region. The vena magna Galeni is compressed. The acoustic nerves contain microscopical blood extravasations; free blood corpuscles are found in the tissue of the modiolus. Reissner's membrane is pressed down upon Corti's organ. Membrane of round window is convex externally. The tympanum shows traces of previous inflammation.

6. CHRIST–SIEBENMANN (26), male, eighteen years. Duration, twenty months. Five months after commencement, tinnitus in both ears. Hearing gradually failed and in one month conversational voice heard indistinctly close to ear. Tuning-fork A placed on skull is not perceived. Rinné positive. Perceived portion of tone-series, Galton $\frac{r.\ 1.8}{b.\ 2.1} - A_1$. Continued decreasing power of hearing, though deafness did not become complete. No bone-conduction. Air-conduction: R, $a^4$–A; L, $a^3$–$a^2$. Drum membrane normal. Optic neuritis, later atrophy with failure of sight. Total ext. ophthalmoplegia except int. and ext. recti.

Paralysis of accommodation, and pupils were immobile. Paralysis of vagus and spinal accessory. Ataxia. Speech retarded. Apathy. Romberg's symptom.

*Autopsy.*—Glio-sarcoma of pineal body, of the quadrig. plate of the tegmentum up to the limit of the pes, of the post. region of the third ventricle involving the posterior half of the right optic thalamus. Ant. part of cerebellum involved. Primary acoustic centres normal (Christ). Both auditory nerves, labyrinth, and tympanum were found normal macroscopically and microscopically (Siebenmann).

7. WEINLAND (35), male, twenty-five years. Duration, two years. Twenty months after onset the hearing on the right side was worse than on the left, and this condition progressed. Optic neuritis; atrophy with diminished vision. Mydriasis; difference in size of pupils. Ataxia; epileptic attacks; slow speech, amnesia; Romberg.

*Autopsy.*—A glioma occupies the left half of the quadrig. plate as large as a walnut. Pressure-atrophy of the vermiform process. Cerebellum pressed into the vertebral canal. Lateral fillet in the left quadrigeminal area is wanting, distinctly degenerated in the proximal part of the pons. The left ant. and post. corp. quadrigemina are hardly recognizable. Central tegmental tract and post. longitudinal bundle are atrophic from pressure, crura normal. Round-cell infiltration of the peripheral layers of the acoustic trunks.

8. BESOLD, I. (42), female, sixteen years. Duration, twenty months. One and a half years after commencement hearing failed, and deafness was absolute in six months. At later stages, optic atrophy and blindness were noted. Anosmia; pain in the extremities; ataxia; speech monotonous and slow. Dementia.

*Autopsy.*—Medullary sarcoma of posterior part of the left optic thalamus, of the entire quadrigeminal plate and of the left crus, projecting into the fourth ventricle and slightly invading the contiguous parts of the cerebellum. Olfactory bulbs compressed and atrophic.

9. BESOLD, II. (43), female, eleven years. Duration, two and three-quarter years. Six months after beginning of sickness, marked diminution of hearing in the course of one month. Separation of the cranial sutures was accompanied with transient improvement in hearing, and amelioration of the other symptoms. Later the hearing grew worse, and during the last two months

patient was deaf and dumb. Choked disc, atrophy, and blindness. Ocular muscles showed disturbance of coördination. Contraction of the extremities. Reflexes increased; epileptiform attacks. Dementia. Intention tremor. Polyphagia.

*Autopsy.*—Angio-sarcoma of both optic thalami, of the entire quadrigeminal plate, and of the pineal gland, occupying the third and fourth ventricles. The floor of the fourth ventricle as well as the cerebellar peduncles are intact. Sylvian aqueduct destroyed. The internal part of the cerebellar peduncles and the internal capsule are affected on both sides; also the left nucleus lenticularis. In the cord, distinct secondary degeneration found in the posterior columns and in Gowers's tract in the cervical region.

10. DALY (z.8), twenty-three years, male. Duration, seven months. In the last two to three months gradual deafness Choked disc, later blindness. Tonic convulsions. Ataxia. Epileptiform attacks. Transient disturbance of speech. Dementia. Polyphagia.

*Autopsy.*—From the place of the pineal body, a circumscribed tumor (alveolar sarcoma) extends for a distance of 5.2 *cm* backward between cerebrum and cerebellum; it is 4.5 *cm* broad. The tumor presses on the surrounding structures; the corp. quadrigemina appear softened and flattened.

11. ZENNER (z.10), male, thirteen years. Duration, ten months. Two months after beginning, deafness set in. Optic neuritis; blindness; transient paralysis of deglutition. Contracture of some of the extremities. Convulsions. Ataxia. Epileptiform attacks; progressive indistinctness of speech. Dementia.

*Autopsy.*—A glioma, slightly adherent to the ependyma, is situated in the ventricles, occupying about an equal space on each side. The tumor is soft and contains a considerable quantity of brain sand; it measures $3\frac{1}{4}$–$4\frac{1}{2}$ *cm*. The auditory nerves appear normal.

We cannot exactly determine the percentage of deafness in tumors of the quadrigeminal region from this group of eleven definite cases of deafness in affections of the mid-brain, on account of the nine cases which we had to exclude from lack of data, and which unquestionably contained some cases belonging to the above group. If we disregard these nine cases entirely we get a relation of $11:49 = 22.5\,\%$; if we add the nine cases the relation is $20:58 = 34\,\%$. Wieland

found 9: 18 = 50 % which cannot be correct as that author did not make use of all the material obtainable.

It is very important to notice that in *not one of these eleven cases was the process found localized to the quadrigeminal plate.* The pontine tegmentum was partly destroyed in case 1. The crural tegmentum was involved in cases 2–8. In cases 9–10 we have only the inexact statement of pressure on the corpora quadrigemina, or on the medulla and pons and their surroundings. In regard to Weinland's case, on which he bases the existence of a quadrigeminal deafness, it is noteworthy that the microscopical examination showed an extensive lesion in the crural tegmentum and the brachium of the posterior corpora quadrigemina, which are regions through which the central acoustic tract passes, but do not in a restricted sense belong to the quadrigeminal plate. The other affected parts of the brain were: Pons (apoplectic areas), case 1; cerebellum and floor of the fourth ventricle, case 2; erosion of the splenium and optic thalamus, case 5; cerebellum and optic thalamus, cases 6 and 8; optic chiasm, case 5; cerebellar peduncles, internal capsule, and lenticular nucleus, case 9. The auditory trunks were found normal in cases 3, 4, 6, and 11, and slightly involved in cases 5 and 7.

*In all cases of deafness in connection with affections of the mid-brain we find either compression or actual destruction of the tegmentum (or of the internal capsule) present.* The cases where the affection has been limited to the quadrigeminal plate, seem to be ten in number. *In all of these comparatively uncomplicated cases of tumors of the corpora quadrigemina the hearing was found to be normal.*

The cases of Passow and Curschmann are of interest as bearing on this point. The first case was that of a patient with symptoms of fairly typical affection of the corpora quadrigemina. At autopsy the corpora quadrigemina were found totally destroyed, though before death the hearing on one side was perfect and on the other there was an affection of the bone and probably panotitis. In Curschmann's case the hearing was normal: the post-mortem examination showed a cerebellar tumor which had almost completely eroded the corpora quadrigemina from pressure. All of these

cases prove that an affection, limited to the quadrigeminal plate produces no deafness. The same fact has been observed in the few observations of hemorrhagic foci in the quadrigeminal region. It cannot be proven from our statistics that a lesion of the tegmentum, due to a tumor, must be accompanied by deafness. Some anatomical and clinical observations have even shown that extensive central changes in the tegmentum may be entirely negative in this respect. We must not however forget that in extensive destruction of the tegmentum the presence of deafness may have been overlooked from one or the other cause (deficient or reduced intellect of patient, or insufficient examination).

A very interesting fact, to which Weinland has already drawn attention, is that in those cases where deafness was noted during life and post-mortem examination showed a degeneration of the lateral fillet, the deafness was only or chiefly on the opposite side. Exceptions to this seem to be the cases of Hope and Mohr, where the deafness corresponded with the side of the most extensive lesion in the mid-brain. On the whole, however, clinical observations confirm the opinion of the anatomists, that the fibres of the central acoustic tract, for the greater part, decussate in the region between the corpora quadrigemina and the labyrinth. It may be possible that individual variations between the number of crossed and uncrossed fibres exist, or that the presence of retrograde decussation in the quadrigeminal area, as has been demonstrated by Held and Weinland, helps to explain the symptoms in the above two cases.

Gowers was the first to advance the possibility of deafness in tumors of the quadrigeminal region to be due to a lesion in the dorsal parts of the crural tegmentum.

In our group of 11 cases, internal hydrocephalus was noted in 10, and in 5 of them to a marked degree; the cerebral convolutions were flattened in 7. This pathological change has suggested that increased intracranial pressure may cause changes in the acoustic nerve and its function as it does in the case of the optic nerve. Moos especially made this an object of research though without arriving at any definite conclusions. Steinbrügge explains the de-

pression of Reissner's membrane and bulging of the round window in the case of Steinbrügge-Gauderer as being the result of increased pressure transmitted from the extradural space to the scala tympani. This explanation of Steinbrügge has not been accepted, as the changes described by him may occur in normal cochleas and may be caused by the technical steps preparatory to the microscopic examination.

Aside from the fact that the deafness in all the cases can be explained by a lesion of the tegmentum, it is noteworthy that of the twelve cases with extensive hydrocephalus internus, only five (42 %) showed deafness, while among the group of cases of deafness, hydrocephalus internus occurred in 91 %. This is unusually large, and is about one-half greater than the percentage (65.5) in the collection of all of our tumors. This disproportion is explainable, because, in the group of deaf cases, tubercular tumors, which rarely are associated with internal hydrocephalus, are only represented by one, and the rapidly growing sarcomas, gliosarcomas, and gliomas, which early exert compression on the vena magna Galeni, are very frequent. In the collection of all tumors, the tubercles are very numerous.

The interesting observation of Besold, that after spontaneous dilatation of the skull the hearing improved for a length of time, shows that intracranial pressure has some influence on the function of the auditory nerve.

The onset, course, and duration of the brain symptoms in our group of cases is as follows: The first symptom is usually headache accompanied by vomiting, diminution of vision, periods of excitation, or a short apoplectic attack. In Hope's case convulsions appeared at the start; in Weinland's, cerebellar ataxia was the first symptom. The following symptoms followed in order of frequency.

| | | |
|---|---|---|
| Affections of the optic nerve | 11 cases. | 100 % |
| Headache | 11 " | 100 % |
| Vomiting | 9 " | 91 % |
| Dysarthria | 8 " | 73 % |
| Disturbance in ocular motility | 8 " | 73 % |

Of which: paralyses of ocular muscles, 6.
Disturbance of co-ordination..... 2.

| | | | |
|---|---|---|---|
| Ataxia | 7 | cases. | 64 % |
| Epileptiform attacks | 7 | " | 64 % |
| Disturbances in motility of trunk and extremities | 6 | " | 55 % |
| Facial paralysis | 5 | " | 45 % |
| Incontinency | 4 | " | 36 % |
| Disturbances of tendon- and muscle-reflexes | 4 | " | 36 % |
| Paralysis of deglutition | 3 | " | 27 % |
| Elevation of temperature | 3 | " | 27 % |
| Disturbances in sensibility of trunk and extremities | 2 | " | 18 % |
| Polyphagia | 2 | " | 18 % |
| Vertigo | 0 | " | 0 % |

These symptoms correspond nearly in frequency with the symptoms of all the cases taken together. Disturbances in speech and in the function of the optic nerve, however, seem to be more frequent in the smaller group. Vertigo (on lying down) is absent in all cases, though it seems to appear as part of the symptom-complex of ataxia.

The duration of the affection varied from two months to two and three-fourths years.

### 6.—SYMPTOMATOLOGY OF PROGRESSIVE DEAFNESS DUE TO A LESION IN THE TEGMENTUM.

a. *Onset, course, and duration.*

The clinical picture of the deafness appears rather late in the course of the disease, usually from three to six months after the onset of the brain affection. In one case deafness appeared in one month, in two cases not until the eighteenth to twentieth month. As these tumors undoubtedly all originated in the pineal body, then extended to the corpora quadrigemina, and later invaded the deeper-placed structures, the relatively late onset of deafness may, consequently, be regarded as another proof for the supposition that the corpora quadrigemina contain no auditory centre.

Deafness commencing only in one ear is noted in only three cases.

Except for the case of Weinland, where the history is rather uncertain, we always find deafness on both sides in the course of the disease. The progress of the deafness varies in rapidity; in general it is proportional to the progress of the disease.

Accompanying subjective noises are rare (two cases) and appeared only in the beginning.

The final stage in the diminution of hearing is usually (82.7 %) complete bilateral deafness.

1. Total bilateral deafness for the voice.....54.5 } 82.7 %
2. Nearly total bilateral deafness for the voice. 18.2 }
3. High-grade bilateral deafness for loud voice..... 27.3 %

In group three are included the cases where the lesion in the tegmentum was not so extensive.

Deafness was bilateral in all of our cases, because the pathological process was sufficiently extensive to destroy both sides of the tegmentum. This of course only applies to the cases where the tumor started from the pineal body, *i. e.*, in the middle line.

b. *Results of the functional examination.*

Freund, with justice, says that we can make the diagnosis of an affection of the sound-perceiving apparatus only when our clinical observation is supported by a post-mortem examination. The former must consider not only the symptoms of disease of the auditory nerve, but of the entire nervous system; the latter must include the macroscopic and microscopic examination of the organ of hearing. The examination for disease of the auditory nerve consists of the following steps:

1 and 2. Examination of air-conduction with the voice and the continuous tone-series, to determine the hearing distance and the perceived portion of the scale.

3 and 4. Examination of bone-conduction (according to Weber and Schwabach) and comparison with air-conduction (Rinné).

Of course the functional examination can only be regarded as characteristic for the pathological state of the nerve and the labyrinth, when no disease of the sound-con-

ducting apparatus is present; when the functional examination is undertaken in a case of central disturbance, disease of the labyrinth (and of the auditory trunk) must in addition be excluded, only in that case are we entitled to make use of the examination in a differential diagnostic manner.

Among our eleven cases of crural tegmentum-deafness, the case of Christ-Siebenmann is the only one to fulfil all of the above five conditions; in fact, I have been unable to find in the entire literature a case of clear central disturbance of hearing where the examination was complete in the above particulars. In the cases which came to autopsy the determination of the portion of the scale perceived through the air has been wanting.

The latter objection holds true for the case of Steinbrügge-Gauderer: in the middle ear on one side were found the residua of a previous inflammation; in the other ear there was an otitis externa. The post-mortem examination of the temporal bones is wanting in the remaining nine cases of our group; air-conduction was examined only with the voice, though in the case of Steinbrügge-Gauderer also with the watch.

In regard to the results of the tuning-fork tests we can only discuss the case of Christ-Siebenmann; though in the three cases where the bone-conduction was tested it was found markedly diminished or even wanting. In Hope's case the tuning-fork placed on the vertex was perceived by the better ear, while in the case of Christ the result was uncertain. Weber's experiment must therefore be considered unreliable.

I was able in Christ's case to determine the tones-limits at various times, both at the onset and at the end. A progressive contraction of the perceived portion of the tone-series was present in both ears. The contraction took place from the upper as well as from the lower limit. It was very interesting and possibly of pathognomonic value to observe that at the beginning the patient heard with the better ear all tones from Galton 1.8 (normal 1.5) to $A_{-1}$ without interruption; $F_{-1}$ and all deeper tones on the other hand were not heard. At the upper limit an entire tone was

wanting, and at the lower end more than one and one-half octaves. The contraction then progressed both from the upper and the lower limit, and the hearing was reduced to the tones at about the normal middle.

*In the central disturbance of hearing depending upon a lesion of the crural tegmentum, the perception of the lower tones is first affected, later the perception of all tones of the scale is equally diminished.*

It was observed that in my patient at the beginning the tuning-fork a′ was perceived by bone-conduction for a much shorter time, while Rinné's experiment in the absence of all middle-ear affection was much shortened (7 or 5 instead of 15–20″). This, I think, is explained by the unusual force necessary to cause the tuning-fork to vibrate, which caused it to be transmitted from the mastoid process through the air. Considering the enormously shortened Schwabach, which appeared in the early stages of the disease, we must have recourse to the evidently purely clinical observation of Politzer, that in deafness due to a brain tumor the watch and acoumeter are perceived normally by bone-conduction, and only are wanting when the deafness has become very pronounced.

It is an interesting question whether the reflexes, such as starting, deviation of the eyes, turning of the head, winking, etc., caused by the hearing of unexpected noises, appear even when the cortical tract in the region of the anterior corpora quadrigemina is interrupted and the patient is deaf. According to Goltz and Munk, these reflexes are never absent in dogs deprived of their cerebral lobes. Our patients have not been examined specially in this direction. These examinations are apt to be without success, because the patients are usually in a markedly apathetic condition from an early stage.

The relation between crural tegmentum-deafness and deaf-mutism is but little understood. According to Mygind (*Deaf-mutism*, 1894) changes found in the central organ of deaf-mutes were limited to the brain, cerebellum, and the medulla oblongata. No mention is made of the corpora quadrigemina, or the crura. The only probable tumors are

gummas and tubercles as the others lead to a rapid death. Isolated cases of acute nuclear disease of the mid-brain are known, in which deafness or deaf-mutism remained. I have observed one of those cases.

In a second case of nuclear oculo-motor palsy with deafness, running a chronic course, which I saw together with Drs. Ranch and Hosch, the process was evidently of a syphilitic nature, and an energetic mercurial treatment caused marked amelioration of the symptoms. At all events post-mortem examination of deaf-mutes, especially with ocular paralysis and ataxia during life, should include the tegmental region of the mid-brain.

### 7.—DIAGNOSIS OF DEAFNESS PRODUCED BY A TUMOR OF THE CRURAL TEGMENTUM.

This diagnosis coincides with that of a tumor of the quadrigeminal or crural-tegmental region which has extended to the neighboring parts of the tegmentum.

In all of the eleven cases we find:

1. Failure of vision. This is a symptom of the direct lesion of the optic nerve, which usually precedes any noticeable change in the nerve (choked disc (?), optic neuritis). The latter appears late but is never wanting. The first signs of atrophy usually appear after three to four months. No mention is made in our histories of the presence of the hemianopic pupillary reaction without hemianopsia, which Knies considers characteristic for disease of the quadrigeminal region.

2. Disturbed innervation of the inner and outer ocular muscles occurs in most of the cases; it is rarely limited to the inner muscles. Bilateral paralyses of muscles with the same name appear characteristic for nuclear affections, as the nuclei of the two sides adjoin. In addition we find loss of convergence-reaction, disturbance of the associated movements of the lateral deviators, paralysis or spasm of accommodation.

3. Ataxia, uncertain gait, are present in $\frac{1}{3}$ of the cases. According to our group the patients suffering from ataxia also show symptoms of ophthalmoplegia.

4. Tremor, clonic and tonic spasm without loss of consciousness, occur in about $\frac{1}{2}$ of the cases.

5. Facial paralysis is almost as frequent.

6. Paralysis and anæsthesia of the extremities rarely accompany the symptoms of tegmental deafness. Among the general symptoms are headaches of no particular localization, vomiting, scanning mode of speech, epileptiform attacks, exaggerated tendon reflexes. The pulse is variable, sometimes slow, at other times rapid.

The diagnosis was made with considerable certainty in $\frac{3}{4}$ of the cases from the atactic gait with ophthalmoplegia (disturbance of accommodation and co-ordination) and the above named general symptoms pointing to a tumor complicated with progressive deafness. In Krafft–Ebing's case there was no deafness but tinnitus and a combination of hemiataxia with oculo-motor paralysis of the other side; ataxia on movement, that form of intention-tremor, seems to be characteristic.

Tumors in the neighboring parts of the brain seem exceptionally to cause similar symptoms. For instance the cases of Bruns and Giese; in the former the tumor was situated in the inferior vermiform process, in the latter the posterior end of the corpus callosum. Deafness however was wanting in both. We know that cerebellar tumors often produce deafness, but in those cases we are aided in the diagnosis by the following considerations: (1) the tumor often destroys the auditory nerve trunk; (2) at the same time the facial nerve is involved; and (3) all of its branches are paralyzed. This is however not always correct as, Bernhardt has shown (p. 213) in his collection of cerebellar tumors; thus in the cases complicated with paralysis of the ocular muscles one must especially investigate the kind of ocular paralysis, whether bilateral or isolated and whether the entire nerve or only isolated nuclear fibres corresponding to the nuclei are involved. The functional examination of the hearing in the beginning of the disease cannot at the present day be said to determine whether the trunk or the central tract is involved. No examination has been undertaken during the first stage of such an auditory paralysis, and

verified by the later post-mortem examination. Examination during a lateral stage, as I have before mentioned, does not furnish results which are distinguishable from those of an advanced affection of the labyrinth or crural tegmentum. On long observation it is at least not difficult to distinguish between the tumors and an affection of the mid-brain, which is mainly localized to the nuclei as the poliencephalitis superior of Wernicke, a form of progressive ophthalmoplegia which after a long duration resembles in its clinical picture the tumors of the quadrigeminal region, with oculo-motor and trochlear paralysis, optic atrophy, ataxia, tremor, and exaggeration of the knee-jerk. So far as I have been able to go over the literature, it has been impossible to find progressive deafness in any of the cases. The points in differential diagnosis given by Wernicke and Böttger-Hitzig are, in brief, absence of choked disc, though white atrophy has been observed. Intellectual and psychical disturbances are present from the beginning, and though in most cases of tumor, stupor and a slowing of speech exist, in the poliencephalitis chronica superior there is rather a tendency to garrulousness which resembles the senile dementia according to Böttger. Reinhold's supposition, that convulsions are always absent in poliencephalitis, does not hold true for Böttger's case. Abducent paralysis is more frequent in poliencephalitis than in mid-brain tumors; this is even more pronounced for the bulbar symptoms, which seem to be almost typical for the later stages of the poliencephalitis superior.

The possibility of tabes must not be overlooked in the examination, from the combination of paralyses the ocular muscles and deafness, as two cases of Marina-Morpurgo show, and with the accompanying ataxia many resemble at first view the picture of a tumor of the quadrigeminal region.

Ilberg has described a case of gumma of the mid-brain or of the tegmentum, with paralyses of the ocular muscles, ataxia, and deafness. This is, however, a rare localization of syphilis. Basal processes are much more frequent and may produce these symptoms; according to Uhthoff, gummata occur fairly often in the intrapeduncular space and produce

paralysis of the ocular muscles which occasionally are bilateral and resemble central disturbance. This form of ophthalmoplegia, which, up to Uhthoff's publication, was regarded as a nuclear affection, is characterized by loss of accommodation and pupillary reaction; isolated mydriasis is often a clue in the diagnosis. Ataxia is rather rare and then usually of special origin bordering on tabes; Uhthoff found changes in the disc in 40 %. The same author found the auditory nerve rather frequently involved in these cases of syphilitic ophthalmoplegia; the trunk was usually affected and not the cerebral portion. In a similar case which I observed, interior and exterior peripheral oculo-motor paralysis, progressive deafness, and some ataxia were present. In the beginning of the disease I noted a relatively decided diminution for the high tones of the Galton whistle with preservation of the perception for the lower tones, which is in striking contrast with the result of my first examination of the hearing in the tegmental tumor (case of Christ-Siebenmann). A second similar case of syphilitic disease of the auditory trunk has convinced me that too great weight cannot be attached to the result of the determination of the tone-limits (in a differential diagnostic view), as in this case, notwithstanding the failure of hearing, the perception of the upper part of the scale remained at about the normal height.

For a complete index of the literature, see the German edition, vol. xxix., p. 88-91.

# PATHOLOGICAL CHANGES OF THE MIDDLE EAR IN MEASLES. REPORT OF EIGHTEEN AUTOPSIES.

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With a Summary by Prof. BEZOLD,[1] München.

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IT has been my privilege, during an active service as assistant to the Royal Ear Clinic of München, to study a large number of cases of middle-ear disease occurring during an attack of measles. The examinations were not limited to those cases in which the ear complication was evidenced by an otorrhœa, but extended over a large number of children confined in the Royal Children's Hospital with measles, without subjective symptoms in many, but where inspection of the drum-membrane showed evidence of middle-ear affection. This paper will treat only of the fatal cases; the post-mortem examinations of which were made by Prof. Bezold and myself.

The incentive to my work was a series of cases of measles reported, in 1887, by Tobeitz. He divided his cases according to their clinical course into

1. Those which ran an uncomplicated course (33 in number).

[1] The contents of this paper represent the careful work of my late assistant, extending over a period of a number of years. Handicapped by ill health, the author was deprived of the pleasure of arranging for publication the valuable material gathered by him before his untimely death. Out of respect for his memory I have taken it upon myself to publish the result of his researches which I will do with but slight alterations. I will conclude the same with a brief summary of the experience gained by myself in the observation of these cases of otitis complicating measles, both as regards the clinical features and the pathological changes occurring in the ear. Bezold.

2. Complicated cases that terminated in recovery (40 in number).

3. Fatal cases (22 in number).

In speaking of the second group, in which the middle-ear complication was apparent (otorrhœa) in but sixteen cases, Tobeitz expressed the belief that the number would have exceeded this by far if the drum-membrane of every child—with and without subjective symptoms denoting ear complication—had been carefully examined. Out of the twenty-two fatal cases (group 3) all but three revealed positive signs of middle-ear complication. Seventeen of this number were dissected, and showed marked changes in the middle ear, while of the five in which no autopsy was performed one was complicated with otorrhœa and another with severe pain in the ear.

In order to study the changes in the ear during the different stages of measles, we have arranged our cases according to the time intervening between the eruption and the fatal termination, beginning with those of the shortest period. Where but one of the temporal bones could be obtained we selected that one in which the inflammatory process had been least marked, as evidenced by the examination during life. Of the following sixteen cases there were two in which both bones were examined. They are included in the following, making a total of eighteen.

CASE 1.—J. K., eight years old; death on third day after beginning of eruption from diphtheria, descending croup, pneumonia, and pleurisy. *Autopsy.*—Croup of the naso-pharynx extending into pharyngeal opening of tube on the *right side.* The rest of cartilaginous tube normal. Bony part of tube filled with muco-pus. The tympanum showed a greenish muco-pus on its floor, and between the malleus and incus, while the mucous membrane was red and slightly swollen. The antrum was empty.

CASE 2.—K. M., three years and nine months. Death on third day. *Autopsy.*—Extensive lobular pneumonia. The entire middle ear and antrum of *right side*, including the mastoid cells and the osseous portion of the tube filled with a muco-purulent fluid. The mucous membrane injected and swollen. Drum-membrane normal.

On the *left side* the cartilaginous portion of tube normal, the osseous portion filled with tenacious muco-pus. Outside of a minute amount of mucus in the niche of the fenestra ovalis and injection of the mucous membrane, the tympanum is normal. Mastoid cells empty and normal.

CASE 3.—F. W., eleven months; death three days after eruption. *Autopsy.*—Croupous pneumonia of right lobe of lung; pleuritis; tubercular bronchial glands. The pharyngeal opening of the tube on *left side* slightly injected. The tympanic cavity and antrum filled with pus. Swelling and redness of the mucous membrane of tympanum, and to a slight extent of the antrum.

CASE 4.—J. D., four years; death on fourth day. *Autopsy.*—Croupous laryngitis and tracheitis; catarrhal pneumonia of both lower lobes; cheesy degeneration of bronchial glands. A diphtheritic deposit at pharyngeal opening of *right* tube, cartilaginous portion of which contains two slight extravasations of blood; otherwise normal. The osseous tube slightly injected. Dura mater over the antrum thickened with a sero-sanguineous infiltration. The tympanic cavity filled with a sero-purulent fluid, the mucous membrane being swollen and covered by a fibrinous deposit.

CASE 5.—R. W., one year and three months; death on fourth day after eruption. *Autopsy.*—Lobular pneumonia. The cartilaginous portion of the tube on *left side* normal; the mucous membrane in the osseous portion swollen. Tympanic cavity full of yellowish-green pus, in parts tenacious mucus. Mucous membrane infiltrated with a serous fluid.

CASE 6.—G. K., three and a half years; fatal termination six days after beginning of eruption. *Autopsy.*—Pharyngeal diphtheria. Cartilaginous tube of *left side* about normal; osseous portion near the tympanum filled with tenacious cloudy mucus. The mucous membrane healthy. The tympanic cavity and antrum normal.

CASE 7.—B. A., two and a half years; period of six days between eruption and death. *Autopsy.*—Lobular and lobar pneumonia; sero-fibrinous pleurisy. The cartilaginous tube hyperæmic at the pharyngeal opening, otherwise normal; the bony tube filled with sero-purulent fluid, and its mucous membrane swollen and red. Tympanum and antrum filled with a sero-purulent fluid. Hyperæmia of the mucous membrane, especially in posterior portion of antrum, where there is some granulation tissue.

CASE 8.—E. A., eleven months old ; death on ninth day. *Autopsy.*—Lobar and lobular pneumonia. The *left* Eustachian tube normal in its entire extent. Tympanum and antrum filled with creamy pus, which is readily washed away ; slight swelling and injection of the mucous membrane.

CASE 9.—B. M., three years ; nine days between eruption and death. *Autopsy.*—Lobar and lobular pneumonia ; croup of larynx and trachea. A muco-purulent deposit throughout the cartilaginous tube (*left side*), and at tympanic extremity of the osseous portion. A deposit of a similar character in tympanum and antrum. The mucous membrane at the floor of the tympanic cavity swollen, also around the ossicles.

CASE 10.—D. B., nine months ; death on tenth day after eruption. *Autopsy.*—Lobar and lobular pneumonia ; muco-purulent bronchitis. The Eustachian tube of *right side*, except for some swelling in the osseous portion, normal. Creamy pus almost fills the tympanum and antrum. The mucous membrane of these cavities, as well as some adjacent mastoid cells, discolored and slightly swollen.

CASE 11.—E. R., one year and three months ; period of fourteen days between the eruption and fatal termination. *Autopsy* Lobar and lobular pneumonia ; recent sero-fibrinous pleurisy. The *left* Eustachian tube shows slight redness and swelling of the mucous membrane. The antrum and tympanum full of pus and the mucous membrane swollen and hyperæmic.

CASE 12.—L. M., two years and three months ; death on seventeenth day. *Autopsy.*—Faucial diphtheria ; lobular pneumonia ; tubercular bronchial glands. The right cartilaginous tube contains glassy mucus, the osseous portion a small amount of muco-pus. Tympanum and antrum filled with sero-purulent fluid ; the mucous membrane discolored and considerably swollen. In the antrum, the inner wall of the tympanum and on the drum, a fibrinous exudate. Some of the mastoid cells filled with their pus.

CASE 13.—R. J., one year and three months ; death on twenty-fifth day. *Autopsy.*—Lobular pneumonia. The entire Eustachian tube on *right side*, filled with a muco-purulent exudate. Fluid of the same character fills the tympanic cavity and antrum. The mucous membrane very much swollen and injected.

CASE 14.—V. K., nine years ; death on twenty-fifth day. *Autopsy.*—Broncho-pneumonia ; purulent bronchitis : pleurisy ; laryngeal diphtheria. The *left* middle-ear filled with pus. Slight

swelling and hyperæmia of the mucous membrane. The deposit in the antrum has a fibrinous character.

On the *right side* the pharyngeal opening of the tube closed with adenoid tissue. The cartilaginous portion is collapsed, the osseous portion shows areas of hyperæmia. Tympanum and antrum full of pus, the latter containing a small pseudo-membrane on its posterior wall. The mucous membrane but slightly swollen ; a medium-sized cell in the mastoid contains pus.

CASE 15. J. J., four years and nine months ; fatal termination twenty-five days after beginning of eruption. *Autopsy.*—Croupous pneumonia ; fibrinous pleurisy ; diphtheria of fauces, larynx, and trachea. The *right* Eustachian tube shows only grayish-red discoloration of the mucous membrane. The tympanum, antrum, and mastoid cells opening into the antrum contain flocculent (fibrinous) pus. Some injection of the mucous membrane and slight swelling.

CASE 16.—B. E., two years ; intervening period of thirty-three days, between eruption and death. *Autopsy.*—Diphtheritic laryngitis ; inflammation of glands of neck ; phlegmonous inflammation of submaxillary glands ; purulent bronchitis and broncho-pneumonia ; collapse of right upper lobe of lung. The cartilaginous tube on *right side* is normal ; the osseous canal swollen and hyperæmic near the tympanum. Thick pus fills the entire middle ear. The mucous membrane swollen, especially in the tympanic cavity.

Opinions differ as to the cause of the middle-ear complication in measles. Wagenhäuser (*Archiv f. Ohrenheilk.*, vol. xxvii., p. 166) expressed the view that the inflammation extends along the Eustachian tube and in support of the theory called attention to the frequency of nasal complication in these cases of otitis. Tobeitz, on the other hand, believed the disease of the ear to originate independently, the same as the eruption, as the disease of the respiratory and digestive tract and conjunctiva, and not to be due to an extension of the inflammation by continuity.

In looking over our cases in an endeavor to solve the question, we notice that in the first five cases (six temporal bones) the period between the eruption and death did not exceed three to four days, but that the cavities of the middle

ear were nevertheless filled with an exudate—the drums being intact. This, along with the fact that the upper part of the cartilaginous tube was always normal, makes us incline toward the view expressed by Tobeitz, that the middle-ear affection was a primary trouble.

Our examinations have further shown that extensive involvement of the middle ear may be present with but slight changes in the drum-membrane. The course of otitis following measles is usually a mild one. In Case 16, although thirty-three days intervened between the eruption and death, the drum-membrane was still intact. The individuals affected seldom have a rise of temperature or complain of pain. The aspect of the drum, which in otitis from other causes indicates the severity of the attack, is not reliable in otitis of measles, as the variability in the pathological changes found at the autopsies shows.

The drum-membrane does, however, undergo changes in measles, which are fairly constant. It loses its lustre and takes on a livid white or bluish-gray color, while the surface appears slightly wrinkled. The reflex becomes dim, or is lost. The epidermis of the drum not infrequently peels off, hiding, as it hangs to the epidermis of the ear canal, the malleus. These changes in the appearance of the drum are so constant that their presence after measles indicates, almost with certainty, extensive complication of the tympanum. It is possible, on account of the slow course of the otitis following measles, for the otorrhœa to begin some time after the eruption. We have frequently seen that the discharge first commenced five or six weeks after the eruption.

## SUMMARY, BY PROF. BEZOLD.

In collecting the above material it was our aim to continue in the line of research followed by Tobeitz. That author found morbid processes in the ear after measles, of such striking character as to lead him to the assertion that the middle ear is affected in every case of this disease. To assure ourselves of the authenticity of this statement, we examined the middle ear of a number of fatal cases of

measles, irrespective of the cause of death, and took the precaution of selecting the organ of that side which the examination during life had led us to believe was least affected. Our cases, in consequence, include no severe destructive processes, as we usually find in scarlet-fever and occasionally in measles. In the only case among our number (Case 10) which was marked by destruction of the drum, otorrhœa had existed previous to the exanthematous disease, and was consequently an independent condition. Notwithstanding our selection of less severe cases,—with the single exception mentioned—we found evidence of an active suppuration of the middle ear in every instance. In one of the cases (No. 6) the deposit of muco-pus was limited to the Eustachian tube, and appeared to have been forced into it from the naso-pharynx just before death. A relative immunity of the mucous membrane of the tympanum may have existed in this instance, the individual having gone through a previous attack of measles, which prevented its involvement during the second attack. In all of our other cases the tympanum contained pus or muco-pus.

A bacteriological examination of the exudation, made at the time of a paracentesis, or after death, showed the streptococcus to be present in most cases, sometimes almost in pure culture. The staphylococcus pyogenes albus was present, but less frequently than the streptococcus, while the staphylococcus pyogenes aureus was only exceptionally found. One or several of the pyogenic species were always present.

Redness and swelling of the mucous membrane of the affected parts was observed as early as the third day; according to Tobeitz, as early as the first day after beginning of the eruption. The cavities were at the same time usually filled with pus. As early as the third or fourth day a fibrinous exudate may have formed and ecchymotic spots be present in the mucous membrane. In four to six days small polypoid granulation tissue was sometimes seen in the osseous portion of the tube, tympanum, and antrum.

It is the exception for the otitis of measles to lead to spontaneous perforation of the drum-membrane. A no-

ticeable feature of our cases was the comparatively slight swelling of the mucous membrane, so pronounced in otitis from other causes. Hyperæmia was also not pronounced, appearing in some cases in patches, while destruction of the mucous membrane, with consequent exposure of bone, did not take place in a single case. A slight necrosis of the mucous membrane in one case finds its explanation in an otorrhœa which had existed before the exanthematous fever.

The slight pathological changes in the otitis of measles in comparison to purulent otitis of other origin is due according to some authors to a less virulent character of the infectious element, and according to others to a local diminution of resistant power occurring simultaneously with a reduced state of the entire organism during the height of the constitutional disease. As the exudate in otitis from different causes has been found to contain about the same species of micro-organisms, the first theory will hardly bear consideration. The theory of diminished resistant power receives support in the protracted course of the otitis in measles. The following case may briefly be cited as an instance of the diminished vitality of the body at about the height of the attack of measles.

R. C., six years old, was examined on October 8, 1895; two weeks ago, had passed through an attack of measles and bronchitis; began complaining of pain in his right ear on October 5, 1895. This was followed on the next day by a discharge from the ear, fever, and inclination of the head toward the affected side. The red and excoriated drum had a perforation in the upper and posterior segment. The left drum was normal. On October 11th, owing to continued elevation of temperature (38.6°), to congestion of the optic disc, and swelling and tenderness—especially on deep pressure—over the mastoid, the antrum was opened. The periosteum was retracted from the bone above and below the temporal ridge, laying bare an area of about one and one half square inches. The mastoid cells—which were small and numerous—were mostly normal, but one or two contained pus. The antrum contained an exudate composed of pus and fibrin on its posterior wall.

The case ran a peculiar course in that the temperature did not

return to normal until the ninth day after the operation, and that the wound in the bone showed little tendency to heal.

Eighteen days after the operation the wound at its upper angle still gaped, exposing white bone. From about that time the bone slowly granulated. The wound did not entirely close until December 3d.

Notwithstanding the otherwise normal course of this case, the bone showed no tendency to granulate until after the eighteenth day. I have observed a similar indisposition of the bared bone to regenerate after opening mastoid abscesses occurring in the course of scarlet-fever, typhoid, pyæmia, and phthisis. This slow repair of the tissue can be accounted for only in a diminished vitality of the tissues during the course of the febrile troubles mentioned.

Applying the theory to the otitis following measles, the protracted course of these cases can best be explained as follows: The swelling and injection of the mucous membrane not having reached the proportions at the height of the fever which they are wont to do in simple purulent otitis, increase in the following weeks under the influence of convalescence, and often reach such proportions as to lead to spontaneous perforation of the drum.

Other observers who have studied the pathological changes in the ear following measles are Habermann (Schwartze's textbook, vol. i., p. 261) and Siebenmann. Habermann examined seven auditory organs of four cases, and in each instance found the mucous membrane of the middle ear inflamed, often ecchymotic, and always covered with mucopus. Streptococci were found in the exudate in each instance, usually in association with the staphylococcus pyogenes aureus. Siebenmann, whose researches were not published, dissected the temporal bone of four children who had succumbed to measles, and Dr. Morf, his assistant, of two additional ones—in all of which the middle ear contained pus.

We have been able to collect this comparatively large number of post-mortem examinations of middle-ear affections, during measles, and there is not an instance on record, in which the ear was found normal after death from measles.

This would justify the supposition, that this form of otitis is an integral lesion of this constitutional disease, the same as conjunctivitis, rhinitis, pharyngitis, and bronchitis. The frequent involvement of the accessory sinuses of the nose can be accounted for in the same way.

In regard to the origin of the disease in the ear, I can but uphold the view suggested by Rudolph. The comparatively normal condition of the Eustachian tube, even in the early stages, makes the theory of propagation along this channel highly improbable.

The entire nature of the affection of the mucous membrane of the middle ear, viz., the variability in extent of the process, the punctate character of the hyperæmia, the ecchymotic spots, and the appearance of small granulations, shows such striking resemblance to the process in the skin that the inference of their analogous character seems justifiable.

In conclusion, a word about the prognosis of these cases, as to the final condition of the hearing, may be of interest. In my examinations of 1807 school children, the history of a previous attack of measles could be elicited from the parents in fifty-two instances. The percentage of cases with defective hearing was not greater in these fifty-two than in the remaining number. In the majority of instances the pus which appears in the middle ear in measles causes no symptoms, and is entirely reabsorbed without leaving any sequelæ.

Besides the features mentioned in our cases, two other pathological conditions were noted.

*First.*—The lymphatic glands at the anterior border of the sterno-cleido-mastoid muscle near its origin were invariably enlarged. In one case they had broken down, and pus had found its way into the naso-pharynx, just below the opening of the tube.

*Second.*—Hypertrophy of the pharyngeal tonsil, was always more or less marked. The adenoid tissue usually spread over the entire opening of the tube and the surrounding parts. On the surface it showed punctate hyperæmic areas and small ecchymosed spots. This condition supports the view of the authors, who consider the acute infectious

diseases in early youth and especially measles a factor in the development of adenoid vegetations.

*Third.*—I have examined the anterior wall of the external auditory canal in every case up to the fourth year of life. My observations confirm those of Zuckerkandl, in that the outer edge of the bony auditory canal is formed in the second to third year, and the apertures disappear in the third year.

# NOTES ON THE PATHOLOGY OF INTRACRANIAL COMPLICATIONS IN EAR-DISEASE.

By Dr W. KÜMMEL, Breslau.

Translated and abstracted by Dr. Edwin M. Cox, New York.

I FEEL justified in presenting the following series of cases of ear disease, with intracranial complications, on account of their interest, although all, except one, ended fatally, even when the focus of disease was reached and removed. During the last few years, unsuccessful cases, and those not operated upon, have not often got into the literature, and this is unfortunate, for such cases are usually instructive. I have described here only those cases which I myself have closely observed and in which I myself have made the post-mortem examinations.

Case 1.—**External Abscess after Recurrent Otitis Media—Operative Exposure of Posterior Fossa—Recovery.**

Man, aged sixty-one. Always well until April, 1895, except for a period of two months, eight years ago, when he had a painful affection of the liver. In April, 1895, he had an acute suppurative otitis media, and paracentesis of the drum membrane was performed. The pus was evacuated and the perforation soon healed but pain in the ear and temporal region began and continued. The paracentesis was repeated four times, with the same result each time. An opening made with the cautery in the drum membrane also healed promptly.

In August, 1895, I found the left drum membrane decidedly reddened, the malleus still clearly defined, and no exudate discernible. The mastoid was neither swollen nor tender, except

the region of the emissary veins, which was very painful on palpation. Percussion revealed no difference from the healthy side. The outer half of the left optic papilla was decidedly redder and more obscure than the inner half.

I could not decide to open the mastoid in view of the symptoms; there was no fever, no change in the pulse, no vertigo, and no disturbance of gait. However, I made a free radial incision in the drum membrane in its lower posterior quadrant, and saw the patient again in two days. He was worse. His gait was unsteady and hesitating, but not swaying even with the eyes closed, and no tendency to turn to either side. No nystagmus. The drum membrane very red, the auditory canal freely open, and no sign of any substance coming from the tympanic cavity. Moderate swelling and tenderness behind the mastoid, but no redness of the skin. Percussion gave a flatter resonance over the left mastoid than over the right. The sound of a c tuning-fork, placed on the vertex, was appreciated by auscultation decidedly less over and behind the left mastoid than on the right; the patient hears it on the left. No fever, pulse about 100, no stiffness in the neck muscles.

This case is somewhat perplexing. Considering the well-marked, though ill-defined general symptoms, and the absence of any trouble anywhere else in the body, we must, in spite of the absence of fever, think of an extensive trouble in the temporal bone. The continuation of inflammation in the drum-membrane, although without the formation of exudate, made me think that the disease must be in the epitympanic recess, or the antrum. The disturbance in the gait and the pain in movements of the head suggested the possibility of trouble in the posterior fossa. The swelling behind the mastoid, and the diminished conduction of the tuning-fork, with the change in the percussion sound, also confirmed this view. My diagnosis, therefore, was one of suppuration in the antrum or epitympanic recess, perhaps also with an extradural abscess in the posterior fossa.

I decided upon operation and performed the usual one upon the mastoid. Nothing found in the diploë. An unusual position of the lateral sinus made the approach to the antrum difficult, and when it was reached it was found full of granulation tissue. In

the floor of the antrum was a small opening leading towards the median line. To get enough exposure it was necessary to remove part of the posterior surface of the petrous portion, and the dura was thus exposed internal to the sigmoid sinus and between the latter and the jugular fossa. At a great depth, I found a pretty extensive cavity in the bone, and at once pus followed. On account of the depth of the wound and the bleeding, further work was impossible, so having assured myself that all the pus was evacuated, I packed the wound throughout with iodoform gauze. I could see that the epitympanic recess was free from granulations, and the dura itself seemed nearly normal. The patient improved steadily, and was out of bed in three days. In eight days the drum membrane had lost its congestion, though some dulness of appearance and moderate retraction persisted. Auditory acuteness about one third less than on the other side.

How the pus reached the posterior surface of the petrous portion is difficult to say. I have come to the conclusion that the abscess was an empyema of the saccus endolymphaticus, as has been recently described by Jansen. I examined every chiselled fragment, and am sure that there was no piece of a semicircular canal removed. It is possible that the aqueductus vestibuli was opened near the saccus endolymphaticus, or that, as above indicated, the pus came through a semicircular canal. It is remarkable that the sigmoid fossa was not involved in spite of its intimate vascular connection with the antrum. This can be accounted for by the sclerosis of the bone. An original labyrinthine suppuration in this case I believe exceedingly improbable. Under these circumstances, I could not decide to open the vestibule, and I believe that the result justifies me.

The intermitting flow of pus from the ear is noteworthy. I believe that the continual attacks of pain and discharge depended not on recurrences of the original trouble in the tympanic cavity, but upon an inflammation accompanying the process in the antrum and becoming worse from time to time. The pus may have come from the epidural abscess. Such an intermitting flow of pus from the tympanic cavity, depending upon suppuration in the antrum or in the bone, is very seldom observed.

CASE 2.—**Double Abscess of the Temporal Lobe after Repeated Operation upon the Mastoid Following Acute Otitis Media—Evacuation of One Abscess—Death.**

Patient, a girl of three, always well until, during the course of a recent eruptive disease, she had an attack of middle-ear inflammation with involvement of the mastoid for which she was operated upon February 27th. In the middle of July another abscess formed under the skin of the mastoid, and another operation was done. Three weeks afterwards repeated vomiting began and the general condition became worse ; convulsive movements first of the left side, and later of the whole body, occurred in one instance, lasting all night. On August 26th the child came under my charge ; the history up to this point was given me by her physician. When I saw the child she was deeply comatose, groaned and cried out occasionally, made frequent movements with the head and extremities, and did not respond to peripheral stimulation. Pupillary reaction good, some spastic extension of the right wrist and two ulnar fingers of the right hand. Muscular strength fairly well maintained. No cough, no opisthotonos. The mastoid fistula still discharged pus. Some tenderness on pressure in the right parietal region and behind the mastoid. Temperature 37.°9 C.

Lumbar puncture yielded no fluid, and the operation was at once proceeded with. A wide flap was made, exposing the whole mastoid region, and the bone freely removed. The lateral sinus did not pulsate. The posterior bony wall of the auditory canal was removed, and the membranous part split. The antrum, recessus epitympanicus, and the tympanum were full of granulation tissue, which was removed, and the malleus and incus were extracted. After this the opening in the tegmen tympani was freely enlarged, and an incision made in the dura which was much thickened. No fluid escaped, the brain did not pulsate, and showed no tendency to prolapse. A test-puncture showed, at a depth of 3 *cm* in an upward and backward direction, somewhat towards the middle line, the presence of thick green pus which was not foul. The abscess, about the size of a pigeon's egg, was then opened by incision, and a drainage-tube was introduced ; the rest of the wound was packed throughout with iodoform gauze. An incision was made previously into the lateral sinus, and fluid blood was found. Next day the condition of the child was unsatisfactory.

*August 29th.*—Another incision into the sinus evacuated some brownish thrombus masses. A cerebellar puncture gave clear yellow fluid. Pulse very small. Death occurred the same afternoon.

At the autopsy, the dural sac was found to contain a little, almost clear fluid, the convolutions were somewhat flattened, and there was no sign of meningitis. A transverse incision through both hemispheres just behind the beginning of the Sylvian fissure opened a second abscess entirely posterior to the end of the drainage tube. The first abscess had not collapsed, but contained no pus. The second abscess was full of pus and was larger than the first. The walls of both cavities were dense and unyielding. The lateral sinus in the neighborhood was full of thrombus, and the tympanum showed the changes made by the operative work. The descending horn of the lateral ventricle was empty and compressed anteriorly. The other ventricular cavities contained clear serum.

Microscopically, the walls of both abscesses showed approximately three layers: first, an inner layer formed of numerous round cells held together by thread-like fibres; second, a layer of thick, glistening connective tissue arranged chiefly in bundles, and stained deeply red by Van Gieson's stain; and third, a layer of demarkation-tissue exceedingly rich in round cells, but not specially characteristic. The ependyma of the descending horn of the lateral ventricle was absent where the wall of the ventricle approached most closely to the abscess cavity. Weigert's stain showed numerous long chains of streptococci in the inmost part of the abscess wall of the unevacuated abscess; in the empty cavity they were fewer and frequently enclosed in round cells. The other layers contained no bacteria. The septum between the two cavities was from 1.5 to 2 *mm* thick.

It is not improbable that, with a correct diagnosis early in the case, the second abscess cavity would have been found, and there would have been a chance of recovery. It is probable that in this case the formation of the septum was secondary in an abscess originally having one cavity. The process of encapsulation in this case is very marked. From the history it may be inferred that the encapsulation resulted in at most seven months, probably in a shorter time. The microscopical examination confirms the experience that, not-

withstanding the incapsulation, the abscess enlarged at the periphery and showed a beginning perforation into the ventricular cavity. The encapsulation of the abscess made the diagnosis more difficult; the density of the wall of the cavity made me think that the wall of the ventricle was before me, and made me cautious of going farther. The marked pressure symptoms indicated the possibility of another abscess, and perhaps should have encouraged me to look for it by further exploration.

(*To be continued.*)

# CHRONIC OTITIS MEDIA PURULENTA—ABSCESS IN THE TEMPORO-SPHENOIDAL LOBE, FOLLOWED BY PURULENT LEPTOMENINGITIS — OPERATION—DEATH.

By A. BARKAN, M.D., San Francisco.

THE history of this case is written with the writer's earnest desire that, although perhaps deficient in details, and unfortunate in its termination, it may be an incentive to others to take decisive and exact measures in similar cases, thus helping development in the field of brain surgery in our midst.

Miss C., twenty-four years of age, single, was taken to the Lane Hospital, in the forenoon of August 15, 1896, suffering from severe ear and head symptoms. To an urgent telephonic summons I responded immediately, and was with the patient at 2 o'clock P.M.

Patient had suffered from purulent chronic otitis media on the right side, dating from an attack of scarlet-fever during childhood. Two years ago, she was treated by me during nine weeks for a subacute attack of the former trouble. The earache and discharge present at that time ceased, and when dismissed she could hear the ticking of my watch $\frac{3}{14}$. She syringed her ear daily since then, and it had given her no trouble.

The illness from which she was now suffering, "in consequence of a cold," commenced twelve days ago; she then began to suffer from earache, followed by reappearance of discharge. Six days subsequently, a severe chill was followed by six or seven others, less severe than the first, having more the character of a moderately severe shivering attack. Vomiting ensued after some of the chills. We were informed that fever had been high, although her temperature had only been taken once, two days previous to

her admittance to the hospital; it was then 101°. The patient had been very weak for a few preceding days, suffering continuously from severe, dull headache in the right temporal region; bowels very loose. Owing to little sleep and little nutrition, the patient became rapidly emaciated. Color of the face, yellowish; lying in a half-recumbent position in a hospital chair, the patient's face indicated suffering; her mental condition one of drowsiness; questions were answered slowly, apathetically; the intellect appeared dulled; and the patient's strength, after a long night's railroad journey, was fairly exhausted. On examination, the external ear was seen to be slightly scalded by hot poultices which had been applied. Auditory canal closed by a plug of cotton-wool, wet with a copious, ill-smelling, purulent discharge; external canal fairly spacious. No sinking of upper wall. Large perforation. A narrow strip of tympanic membrane above, adherent to promontory. No ossicles visible. Eustachian tube freely permeable on catheterization. Integument over mastoid pale; no œdema. Distinct sensitiveness over the whole mastoid extending to its tip. Pupils moderately contracted. After the use of a mydriatic, the ophthalmoscope revealed healthy fundus, mobility of eyes normal, no signs of motor disturbances in face. Temperature, 102°; pulse, 102. The very severe and striking clinical aspects of the case before us indicated, beyond a doubt, brain complication, spread there by pyogenic infection from the right ear. The probabilities were that the cerebral invasion had been for some time past slowly preparing; the acute setting in of grave symptoms only dated from six days back, but had set in immediately with very threatening symptoms; severe and repeated chills, vomiting, high temperature and pulse, constant and severe headache, drowsiness.

As the patient evidently could live only a very short time, an opening of the cerebral cavity was clearly indicated, and, in consultation with Dr. Lane, an immediate surgical interference was decided on as imperative. The patient was forthwith made ready and etherization proceeded with. Although there was no swelling, and the posterior and upper walls of the external meatus were not sunken, it was considered best, on account of the sensitiveness to pressure, to open the mastoid, in order to get an entrance through it into the brain. An extensive incision, parallel with and behind the insertion of the auricle, was made through all the tissues, to the bone. The periosteum was pushed

carefully aside, the bleeding easily controlled with forceps. The bone was normal in color over the whole exposed surface. A few strokes with the chisel revealed eburnization of the bone to a depth of 1½ centimetres. There were apparently very few mastoid cells, and the antrum was reached at a depth of nearly 2 centimetres without a trace of pus. There was a slight bleeding from the intensely compact bone. The greater portion of the posterior osseous wall was then removed, and soon the tegmen of the tympanum was reached, without finding a trace of any ossicles. Examination with probe failed to reveal an erosion in the tegmen of tympanum or antrum. The mastoid was then completely chiselled through the opening, being about one half inch in diameter, and the dura was exposed over an area equal to about the size of a twenty-five cent piece, by means of bone-forceps. The bone was very brittle and dark colored ; the dura of an ashy-gray color, and very tense. No pulsation was discernible to the eye, but could be detected by the finger. The aspirator-needle was then introduced into the most suspicious-looking spot, bringing out ½–½ a drachm of a bloody, fetid pus. The dura was then taken up by forceps and opened with scissors to the extent of half an inch, and the aspirator-needle passed in different directions without finding more pus. The bone was still farther cut away, and the dura opened downward toward the tegmen tympani about half an inch. The brain tissue there was found to be extensively ulcerated and necrotic ; all further attempts to get at a pus cavity with trocar and narrow-bladed knife failed. There still was, however, a good-sized opening, which was then gently flushed with warm, sterilized water. The patient sank rapidly, and the wound was then dusted with iodoform and boraic acid 1–3 parts, and packed loosely with iodoform gauze. The external wound was partly closed by a few catgut sutures, and a dressing applied.

There was no marked shock after the operation ; the temperature three hours later was 99.8°, pulse 130. The temperature rose gradually to 103.6° at 1.30 A.M., then declined until 7.30 A.M., when it reached 99°. The patient was fully conscious, and was given during the night, to relieve pain, phenacetin grs. x and McMunn's elixir of opium m. xx. As nourishment she took milk and rice at proper intervals. She complained continually, after the operation, of pain in the right side of the head and in the left arm, especially the shoulder.

During the day (Sunday) the patient continued in a more or less drowsy condition, and the fever gradually rose to 104.3° in the afternoon. The dressings were removed late in the afternoon, and owing to the rise of temperature further search was made for pus. The needle was inserted in several directions, finally bringing up pus, a little deeper and more anterior to that found the day before, in such a quantity that there seemed to us no doubt of the abscess cavity having been struck in the temporo-sphenoidal lobe. A pair of blunt forceps was then inserted along the track of the needle, and by spreading the blades, a free opening was made to the site of the pus. The brain tissue about and above the abscess cavity was decidedly necrotic. The cavity was then packed with iodoform gauze, the wound redressed as before, and an ice-cap applied to head.

Shortly after this dressing the temperature rose to 105.6°, but fell during the night to 102°. All day Sunday the patient was given whiskey and egg-nog every two hours, as much as she would take, which was from one to three ounces. She was restless, and complained of pain most of the time.

On Monday morning the temperature was 105.6°, the pulse 143, remaining high all day. The patient was in a comatose condition, from which she could be only aroused once during the day. Nourishment was given per rectum, but little was retained. The wound was dressed in the afternoon ; the packing was found saturated with fetid pus and covered with sloughing brain tissue. The patient then gradually sank, dying about 8 P.M. Before death the temperature was 103.2° and the pulse 160.

*Autopsy.*—Vertical incision 4 inches long, extending from tip of mastoid to 2 inches above the ear on the right side. Excavation in mastoid ½ inch in diameter posterior to the external canal. Posterior wall of canal cut away, opening antrum and tympanic cavity. An interval in skull immediately above about 1 inch in diameter, from which protruded meninges and sloughing brain substance. The bone anterior to this opening dark in color, otherwise normal. On opening dura, a small amount of fetid pus escaped from the region over the posterior part of the temporo-sphenoidal lobe. This lobe and adjacent posterior portion of the brain were compressed and covered for an area 4 inches by 3 inches with pus, the vessels were injected, and there was considerable superficial necrosis. This area was bounded by very delicate adhesions. The middle fossa of the skull contained pus

beneath the dura ; but the cerebellar region was free from pus and the lateral sinus was normal.

On section, the brain was found diseased only superficially over the area described above. In the centre of the temporo-sphenoidal lobe was found an abscess cavity about 1¼ inches anterior-posteriorly, and ½ inch vertically and transversely, lying in the white substance of the brain, immediately above the tegmen tympani. The incision made during the operation opened into this cavity surrounded by sloughing brain. The temporal bone showed no microscopical changes in this region, the dura was not unduly adherent, nor could any opening be seen through which the pus from the ear might have invaded the brain.

# NOTES UPON SOME NEW LOW-TONED TUNING-FORKS FOR CLINICAL PURPOSES.

By EDMUND D. SPEAR, M.D., Boston.

A PAPER published in the Medical and Surgical Reports of the Boston City Hospital for the year 1896, but originally written in part as early as 1891, contains a reference to the use of low-pitched tuning-forks in testing the hearing power of patients in whose ears objective appearances are wanting.

In that article the use of some form of sonometer, consisting of a series of tuning-forks, was also advocated for general use for aurists. My convictions as to the importance of having many standard forks for testing purposes were strengthened when I learned of Prof. Bezold's experiments with forks constructed by Edelmann of Munich.

Physicists naturally turn to Koenig, of Paris, for information concerning so important a matter as the making of acoustical instruments of precision, and readily learn that forks of all sizes can be obtained from him.

Up to the time of Prof. Bezold's last publication upon this subject, steel had been considered the proper metal out of which all forks should be made. The serious objections to steel as a material for the manufacture of low-toned forks, aside from its weight, arise from variability in its quality and texture, and these objections apply almost equally to mixtures or alloys of softer metals, even to those of aluminum. Edelmann used bell-metal in Bezold's forks. The quality of this latter metal seems to depend in great measure upon the quality of conscience possessed by the foun-

dryman, and not infrequently an excellent alloy may be spoiled by careless handling in the crucible.

While this criticism applies with almost equal force to the alloy chosen for the writer's forks, its power is greatly weakened by the fact that the original alloy contains substances less capable of oxidation from overheating, and by working on a large scale a uniform result can always be obtained.

By careful attention to details during the different stages in the process of manufacture, a skilful workman has lately produced for me some fine instruments with very few overtones. Forks giving tones corresponding to those in the lowest octaves have already been finished, and by having solved the problem and passed the experimental stage, the production of any desired tone is now possible.

The lowest fork of my series is Bb .29 M. long (less than 12 in.) and weighs .312 Kgm. (11 oz.).

Of all instruments for producing the tones of the musical scale now in use, the tuning-fork is best suited to the purposes of the aurist, and when great accuracy in deciding the loss of individual tones is essential, the comparative uniformity of tone in this instrument admits of the detection of slight variations from normal.

In making the hearing test of aural patients I prefer to have a fork for each separate simple tone. To obtain a pure tone or the fundamental tone of any fork it is absolutely necessary to damp its partials either by touching the instru ment at its node or by supporting the instrument between one's thumb and finger at its node after sounding it.

This method of obtaining a tone free from overtones has long been taught by the writer, and was referred to in his article in the City Hospital Reports.

From the Transactions of the International Congress of Psychology is appended the title to Prof. Bezold's paper, entire, with an abstract from the essay itself.

" Demonstration of a Continuous Tone-series (sonometer) for showing defects in the hearing, especially among deaf-mutes, and the significance of its indications according to the Helmholtz theory."

" The series of instruments consisting of tuning-forks and

whistles, spoken of in this essay under the name of continuous tone-series (sonometer), is first in importance among the necessities in the outfit of the aurist of the future."

"In the lower half of the tone scale from $C_{II}$ with sixteen vibrations (double) and under, up to $C_{III}$ the separate tones are produced by means of ten tuning-forks with sliding weights. The highest tone of every deeper tuning-fork is also contained again as an undertone in the next higher one."

"So far as a practised ear can determine thereon without further expedient, the combined tones of these loaded tuning-forks are free from overtones."

BIBLIOGRAPHY.

(a) KOENIG, *Quelques Expériences d'Acoustique*, Paris.

(b) BEZOLD, *Abhandlungen des Internationalen Congresses für Psychologie*, 1896, München. "Demonstration einer Tonreihe," etc.

(c) EDELMANN, *Ausstellung der Psychologischen Apparate zum Internationalen Congresse*, 1896, München.

# AN INITIAL SYMPTOM OF SCLEROSIS.

By Dr. ZWAARDEMAKER, Utrecht.

Translated and abridged by Dr. Arnold H. Knapp, New York.

As now, through the researches of Politzer and Bezold, the conception "sclerosis aurium" has lost its former uniform character, which Walb in Schwartze's Text-book still gave it, we will first define accurately the disease in question before describing a new initial symptom.

Walb's primary sclerosis can be subdivided as follows:

1. The primary disease of the bony capsule of the labyrinth.[1]

2. The adhesions of the stapes to the walls of the oval window, a similar condition surrounding the malleus and at the round window by thickening of partly fœtal bands[2] (hereditary[3]).

3. The general sclerosis of the tympanic mucous membrane and the tubes, probably subsequent to a similar process in the naso-pharynx.[4]

In addition to these three processes, progressive from the onset and always bilateral, a secondary sclerosis has been described, resulting from a chronic aural catarrh. This is characterized by the formation of exudates or occlusion of the Eustachian tube, at least in the early stages of the disease, which are followed by changes in the drum membrane (thickening, cicatrices, deposits of lime), or by retraction of

[1] Politzer, *Zeitsch. f. Ohrenhlk.*, vol. xxi., p. 309; these Archives, vol. xxiii., p. 253; Bezold, *ibid.*, vol. xxvi., p. 9; these Archives, vol. xxv., p. 67.

[2] Habermann, *Schwartze's Text-book*, ii., p. 24.

[3] Moos, *Schwartze's Text-book*, i., p. 489.

[4] Gradenigo, *Gougenheim's Ann.*, 1868, p. 130.

that membrane. Primary, as well as secondary, sclerosis may lead to anchylosis of the stapes, which is always the case in the process described by Politzer under 1.

This schematic arrangement is not perfect, and is incomplete. Certain subdivisions, based on pathological examination, were omitted as the ossification of the stapedio-vestibular ligament, the thickening of the mucosa of the round window, etc. The diagnosis in the living, however, rarely determines more than a bilateral progressive middle-ear affection, which is primary and without pain, without exudate, and without change in the drum membrane. A well-known characteristic of these cases is the early loss of hearing of the lower tones. Bone-conduction of forks of a medium octave is excellent. These are the most reliable symptoms, besides the appearance of the drum membrane, the immobility of the malleus, and the sound on auscultation.

I wish to draw attention to a new functional symptom, which is of importance in the ordinary form of sclerosis (anchylosis of the ossicular chain without involvement of the labyrinth). It is limited, therefore, to two of the above-mentioned processes: adhesions of the oval window and sclerosis of the tympanic mucous membrane and of the tube. It is uncertain whether the first stage of the primary disease of the bony labyrinthine capsule is included. At all events it does not hold good for the complete disease described by Politzer and Bezold. This is a true initial symptom, a symptom which may persist for years and be unnoticed, and is only characteristic for the first stage of the disease. We may select the following definition. In primary sclerosis, almost without exception, a displacement of the upper tone-limit takes place upward above the normal limit; it may remain stationary during the first years, and gradually contract again or become displaced downward. A sclerosed ear will hear during this stage one, two, or more half-tones than a normal ear of the same age. The latter fact furnishes us with a convenient scale to measure this symptom. I have examined 50 cases of sclerosis aurium for the chromatic or continuous (Bezold) scale. The upper tone-limit was as follows:

| | |
|---|---|
| Raised, upper-tone-limit | 32 |
| Normal, upper tone-limit | 5 |
| Lower, upper tone-limit | 13 |
| | 50 |

The typical cases belong in the first group. In the second group are the cases which have existed for a length of time, the initial symptom has become less marked, and the upper limit has returned to the normal. We have united these two groups of cases in one table. On examination we find that there are 5 cases where the tone limit was not found elevated in one of both ears; the process had existed for several years, and the round window had become less accessible to the waves of sound. We cannot, therefore, consider these 5 cases as exceptions. Opposed to these, there are 13 exceptional cases, of which 8 were far advanced.

Of these thirteen cases there were eight where the process had advanced to such an extent that we can no longer speak of a beginning sclerosis. In these an elevation of the limit could be expected. Secondary stapedial ankylosis, and perhaps commencing labyrinthine involvement, must be present at least in three cases. It is generally accepted that the immobilization of the ossicles is followed by a lesion of the inner ear. This process need not be limited to the base of the cochlea to produce a decided loss of hearing for the the highest tones, as it is quite possible that the latter simply cause a diminished auditory power for all the tones heard in the beginning of sclerosis. A premonitory sign of the progression of the process to the inner ear is perhaps the paracusis Willisiana. Urbantschitsch, as is well known, has given a different explanation for this phenomenon than the usual one, and has located the process in the labyrinth. I should like to concur with his opinion and consider the paracusis Willisiana an altered condition of the excitability of the sound-perceiving apparatus, characterized by the fact that the excitation-threshold is elevated, but the difference-thresholds have remained almost unchanged. The cause for such a change cannot possibly lie in the conducting-appar-

atus, as a lesion there, would cause an elevation of both. We are forced to look for the cause of the change in the excitable elements themselves. The unfavorable prognosis of the paracusis Willisiana in sclerosis is readily explained by this line of reasoning, and at the same time the fact is explained why the paracusis usually is present in the advanced cases and not in the beginning sclerosis. Of the remaining five cases, which do not belong to the advanced ones, is one of an officer who lost his hearing from the effects of shooting practice. In this case the involvement of the labyrinth was very likely present. Two further cases were chronic aural catarrhs where no exudate or occlusion of the Eustachian tube were found at the examination. These cases are not true sclerosis still we did not wish to exclude any cases which might have some feature of the disease. Two cases remain unexplained. The one was examined but once, and was complicated with a fatty heart and obesity. The other was a genuine sclerosis, where the lowering of the upper tone-limit has always puzzled me. The lowering of the upper tone-limit would in this case be the only sign of a labyrinthine involvement.

The elevation of the upper tone-limit, as has been stated, is a phenomenon in part of the excellent treble-hearing of those suffering with sclerosis. This also permits the perception of the higher vowel tones, the high sibilant sounds as the Dutch S, etc. This fact is in sharp contrast to the early loss of the lower octaves. The tuning-fork C, free from overtones, when the amplitude of the prongs measures 1 *mm* and more, is no longer heard in incipient sclerosis. The contra-octave of the harmonica, where vibrations of the first overtone are distinctly heard beside the fundamental tone, is very soon lost by the patient. On the other hand, the hearing for the highest octave of Urbantschitsch's harmonica, for the f-sharp$^4$ fork, and for König's rods is excellent.

In short, sclerosis is a deafness for base-tones, and in the early stages the treble-tones are excellently preserved. There is, in fact, a row of the latter notes which adjoin the limiting tones, and are better perceived than by the normal ear. Our initial symptom may be formulated in still another way,

for we may speak of a dislocation upwards of the entire scale, accompanied, of course, by a shortening at the lower end. Does this symptom aid us in the differential diagnosis? It is absent in the chronic catarrh with exudate, thickening and changes in the form of the drum, accompanied by hypertrophic processes in the nose and the naso-pharynx, which for some length of time cause an occlusion of the Eustachian tube. It is also absent in the primary disease of the labyrinthine capsule described by Politzer. In the two of the three cases described by Bezold, which were specially examined, a lowering of the upper tone-limit was found. This result agrees fully with the cases where the extreme deafness in advanced cases of sclerosis makes a secondary ankylosis of the stapes probable, and where our initial symptom was found wanting. This, of course, does not prove that this initial symptom could not be present in the beginning affection of the bony labyrinth. Other diseases than the chronic catarrhs and the primary and secondary ankylosis of the stapes need not be considered in the diagnosis, and it seems to me that this, our initial symptom, is of considerable value diagnostically.

I think that it will not be out of place to attempt some explanation for our new-found fact.

The immediate result of a sclerosing process, in the ossicular chain and about the oval window, is an impediment to the conducting apparatus. The vibrations en bloc are thus more or less injured; this has generally been held responsible for the loss of the deeper tones. With the disappearance of these vibrations, however, the interference is also done away with. Helmholtz [1] has proved that the interference for the sound waves of greater length can be disregarded but is of importance for waves of sound of shorter length.

It is an advantage for the upper tone-limit, when the ocular vibrations are checked and the bone-conduction is increased by the addition of sound waves. The sound waves are conducted through the temporal bone by a round-about path, and those, directed in a straight line, arrive at the cochlea at about the same time.

[1] Helmholtz, *Pflüger's Arch.*, 1868, vol. i., p. 1.

It is quite in keeping with our conception that in sclerosis a tone is never gained which the patient has not possessed in early youth. The disease of the conducting apparatus simply permits of the new transmission of tones which formerly, although weak, took place, and later cease, through the loss of bony elasticity. This is most noticeable in the sclerosis of age when the loss in the maturer years is marked and the recovery can be considerable. This symptom is not entirely wanting in the sclerosis of young age.

If we consider the loss of interference to be the chief reason for the elevation of the upper limit, there are other points which may be cited in favor of this supposition. We should like to mention the smooth, firm walls which the sclerosed middle ear usually possesses. This condition makes the middle ear a resonator for tones of short wavelengths.

The initial symptom which we have just described can perhaps help us in explaining another initial symptom of sclerosis. Usually, in the typical cases, continuous tinnitus is of considerable prominence as a symptom even at a period when the patient hardly appreciates that he is growing deaf. The tinnitus is influenced by augmentation of the heart's action, and may become pulsating, isochronous with the heart-beat. The tinnitus is probably a perception of a vascular murmur. The patient, upon inquiry, will state that the tone-height of the tinnitus is very high, and occasionally one will state that it is like the noise made by the Galton whistle when passing over the tone-limit. Hence we may suppose that the tinnitus depends upon a noise composed of a number of very high notes which normally could be heard but are not transmitted. The altered condition, caused by the sclerosis, improves the transmission and causes it to be perceived. The perception is so much easier the louder the tinnitus (increased cardiac activity), or the more acute the irritability of the labyrinth (on awaking).

It seems to me that the tendency of the sclerosing process to perfect the hearing for a certain group of tone during the first few years might aid us in devising a line of treatment. For instance, the pathological condition might be employed.

If it were possible to transpose tones out of the middle octave to a higher tone scale, the patient would obtain a better hearing for music than normally, provided, of course, that the transposition takes place without loss of intensity. The solution of this problem lies really more in the province of a mechanician than a physician, and I think that it is quite possible to invent an apparatus on this idea which would be of inestimable benefit to the many sufferers with sclerosis.

# THE POSITION OF THE CONSONANTS IN THE TONE-SERIES.

First supplement to the "Hearing Power of Deaf-Mutes."

By Prof. BEZOLD, Munich.

Translated by Dr. Arnold H. Knapp.

ABOUT three and a half years ago, I examined the 79 inmates of the Munich Deaf-Mute Institute for the remnants of hearing-power and to determine more definitely in each case their limits by means of the continuous tone-series. The results were published in the beginning of this year in my monograph on the hearing-power of deaf-mutes.[1] The qualitative and quantitative perception of tones was examined, and in addition the perception of vowels, consonants, and words, as well as the relation in each case between the hearing of tones and that of speech. It soon became clear to me that the examination of deaf-mutes with the aid of the tone series was not only of theoretic value in determining the various conditions which had led to deafness, and in investigating the physiological function of the various parts of the auditory organ, but also of great practical value in helping the selection of those patients that could be instructed aurally, and to permit us to judge to what degree improvement can be expected in each case.

Fifteen or 19 per cent. of the 79 pupils were completely deaf on both sides for speech and tones. It will be seen later that this percentage is too large. 28 or 35.4 per

[1] Wiesbaden, J. F. Bergman, 1896.

cent. could hear either on one or on both sides a part of the tone-series in addition to vowels and words. 17 of these 28 were able to repeat at various distances up to several metres several or all the numbers in the same intonation and rhythm as they were spoken; 9 repeated all of the numbers, 5 repeated all except "five," and 3 only a few or a single number. The remaining 11 were able to repeat one up to all of the vowels.

Besides these 28 who could hear vowels or words, there were 3 who, though deaf for vowels, could correctly repeat certain consonants. The consonants P, T, and R must be thrown out, as the majority of the totally deaf can distinguish between them.

These 31 pupils who retained a partial hearing of speech are only a fraction of the total number of hearing pupils. 32 pupils, in addition, possessed hearing power for tones which occupy varying portions of the tone-series, and only 15 were totally deaf; 1 inmate could not be examined.

I have arranged the results of the examination of hearing according to the number of individuals, as this permits a better general survey of the results which may be obtained by future examination of deafness than the grouping according to the various auditory organs, which I found necessary in my previous article.

As to the relation between the hearing power for various parts of the tone-series and the hearing of speech of all the hearing deaf-mutes, I came to the following conclusion:

The perception of the area of the tone series included in the interval $b^1$ — $q^2$ inclusive is essential to the understanding of speech; if the duration of hearing for these tones sinks below a certain level, it becomes insufficient for the understanding of speech. When the hearing for this interval is absent on both sides, the hearing for speech is also lost.

I showed, further, that this result was in accord with the physiological investigation of the true tones of the vowels, as these are situated chiefly within this part of the tone-series.

We may expect that an examination of a large number of

deaf-mutes in regard to the relation of the hearing of tones and speech will determine the position of the parts in the tone series necessary for the perception of each vowel and consonant.

The knowledge of these positions would be of more than theoretical value. We could then, on the basis of the examination of the tones, exactly denote the method of practical tone-exercises for each case; the teacher would know the syllables which are perceived by the pupil and the others which would require cultivation with the articulation method.

A general classification of my results of the examination of the consonants and vowels may be of interest.

It has often happened that the comprehension of a word does not include a distinct perception of each sound contained in that word. A subsequent examination of the sounds often reveals defects. This is explained by the fact that some of the hearing deaf-mutes have learnt to guess the word from the few sounds perceived. Consequently, it was necessary to examine not only the words, but later each separate vowel and consonant. From the grouping of separate examinations, we may draw the following conclusions as to the auditory power for each consonant:

The consonants P, T, and R must be disregarded on the above-mentioned grounds. The consonants M, N, T, and K were most frequently found wanting. M and N are the only consonants whose approximate position in the tone-series Helmholtz has discussed in his *Lehre von den Tonempfindungen*. According to Helmholtz, the humming sound which is caused by the formation of M, N, and Ng adjoins the U situated lowest in the scale among the vowels; the proper tone is placed on F, its timbre permits variations of the proper tone to almost the breadth of an octave. "The nasal cavities which furnish the means of exit in the formation of the above-mentioned consonants have, in proportion to the size of the cavity, still a narrower opening than the buccal cavity in the case of the vowel U." The proper tone of this consonant must consequently be situated still deeper than that of the vowel U.

Oscar Wolf[1] agrees with Helmholtz in the position of M and N, and gives the consonant L an effect equal to one preceding or following a vowel. Wolf considers $d^{II}$ and $d^{III}$ as the upper and lower limits of the consonant K, which is a relatively low position compared to the sibilant sounds, which are also of interest for us.

The frequency of the extinctions of the four consonants M, N, L, and K in deaf-mutes with preservation of some hearing, is explained by means of the examination of the continuous tone series. The lower part of the tone series where we find the location of these consonants is the part which is most often and most extensively extinct among the deaf-mutes. The deaf-mutes, who, in addition to the other consonants, were able to repeat correctly the above four, possessed usually a hearing range which extended down to the E of the large octave.

Case 19 of my previous report was very interesting in this particular. Except for a short range ($b^{III}$ — $c^{IV}$ right, perception for the upper half of the scale was wanting on both sides, commencing in the right at $a^{II}$, in the left at g sharp$^{III}$, while the part of the scale below this was heard perfectly and of the ordinary duration. Although the deaf-mute could hear numbers and short sentences, especially on the left side, he could only repeat correctly L and N, excluding P, T, and R. This is the only case where a bi-lateral defect in the upper-tone scale was present, and only the consonants, L and N, placed in the lower part of the scale could be perceived.

Five ears could perceive the K alone, of which three could hear the S correctly. The hearing range extended in these cases from the middle of the Galton whistle or above, as the upper limit, to $f^{II}$ in case 17 r.

" c sharp in case 5 r.
" $b^{I}$ in case 5 r.
" H " " 48 r.

Case 17 shows that a perception for the consonant K may be present notwithstanding the loss of the entire lower part of the tone-scale up to $e^{II}$, and that its position is to be looked for above this tone. Wolf considers the tone-limit

[1] *Sprache d. Ohr.*, Braunschweig, 1871, p. 44.

for K to be $d^{II}$ to $d^{III}$. Four ears were limited in their perception of the individual consonants to F:

in Case 21 r. the tone-range was F sharp$^{I}$ to Galton 4.2.
" 30 l. " " " F sharp$^{I}$ to Galton 3.6.
" 1 l. " " " F–$g^{IV}$ and Galton 9.0–6.8.
" 21 l. " " " g sharp$^{II}$ to Galton 4.4.

Leaving out the small island in the Galton in Case 1 l, the pitch of consonant F is situated between f sharp$^{I}$ and $g^{IV}$. Wolf found this limit to be $a^{II}$ and $a^{III}$.

Of the sibilant sounds, S and Sh were examined for; Z was disregarded as being composed of T and S.

Five ears could only perceive S of the consonants (excluding P, T, and R); in two, Sh was likewise perceived. In these cases the tone-range extended high into the Galton whistle, to the marks 3.5–2.5. The lower tone-limit was $e^{I}$ (Case 29 l.) h (Case 2 r.), E (Case 43 r), c sharp$^{I}$ and $B^{II}$ (Case 51 r. and l.).

Thus, from the examination of deaf-mutes, the tone-limits for S lie between $e^{I}$ and Galton 3.5. Wolf found this to be $c^{IV}$–$c^{V}$. The duration of perception for $c^{IV}$ in these five cases was twice 0.4, and once each 0.6, 0.8 and 0.9; in short, considerable.

Usually, beside deafness for the other consonants, there remained a correct power of perception for Sh, *i. e.*, in twelve cases. In addition to this consonant, K was heard three times, S twice, and F once.

The hearing power for the tone-scale extended up in one of these cases to $e^{V}$ only, and down in one case only to c sharp$^{II}$. The perception for the consonant Sh is therefore to be sought between c sharp$^{IV}$ at $e^{V}$. Wolf found in Sh the triple sound of $a^{III}$, $d^{IV}$, and f sharp$^{IV}$.

In the other cases, where more consonants than the above were perceived, a larger continuous hearing range for the tone series was present and extended at least from f sharp$^{I}$ to the middle of the Galton whistle.

Not a consonant could be correctly perceived in six cases. In these the hearing range extended from E to the middle of the Galton whistle.

In conclusion, after the above comparison between the

perception of the single consonants and the extent of the hearing range within the tone-series in each single case, we may say that these stand in the same accordance to the previous supposition of the position of the consonants in the tone-scale as we found to be the case for the vowels in our first article. The relatively small number of deaf-mutes which were examined did not permit to locate the limits of each sound in the tone scale so exactly as perhaps later examination of a larger number will do.

Hearing tests in the partially deaf have led to similar results. Besides defects in the lower part of the tone-scale, as are characteristically found in chronic affections of the sound-conducting apparatus, the difficulty of comprehension for words containing sounds in the lower part of the scale was present, while in affections of the nervous apparatus with their frequent defects in the upper part of the scale the difficulty of comprehension of words containing an S-sound is known.

# INTRACRANIAL EXTENSION OF A MIDDLE-EAR SUPPURATION. OPERATION AND RECOVERY.

By Dr. E. SCHMIEGELOW, of Copenhagen.

Translated and abstracted by Dr. Edwin M. Cox, New York.

THE following case illustrates the difficulties of an exact diagnosis of the intracranial complication of middle-ear suppuration.

A boy, twelve years of age, had a left-sided middle-ear suppuration when two years old; the drum membrane had perforated spontaneously and the subperiosteal abscess which formed behind the ear, had been opened by incision. Since that time there had always been more or less discharge, and it was noted that washing out the ear caused transitory dizziness and the appearance of the fluid in the mouth. On August 5th, 1895, after unusual exertion, there was increase in the discharge which became foul, and on August 18th, the boy went to bed on account of the pain and fever. Under local treatment the pain disappeared, but the dizziness continued, and the patient vomited if he attempted to get up. This condition disappeared in a few days but the discharge was still very free. September 9th, he was well enough to go to school, but on the 14th, had a return of pain, and next day again had dizziness and vomiting. His pulse and temperature were not noteworthy. On September 19th, he could not endure noises and vomited whenever he raised his head. He was then removed to a hospital and his condition noted as follows :—pale, thin, and lying on right side, rational but answers slowly, movements of the head cause dizziness and nausea, no paresis, pupils equal, and tongue protruded straight. Has pain localized in left

temporal region. Ophthalmoscopic examination was unsuccessful. Temperature normal, but the pulse only 58 and somewhat irregular. The mastoid region neither swollen nor tender. Examination of the condition of the middle ear was impossible on account of the discharge and the swelling of the walls of the canal.

From the symptoms it was not to be doubted that there was an intracranial lesion following the suppurative condition in the temporal bone, and my diagnosis tended towards a brain-abscess, perhaps with an epidural abscess in addition. As usual, it was uncertain whether the main lesion lay in the middle or posterior fossa; hence, I think it the best plan, first to fully expose the focus in the temporal bone, then to open into the middle cranial fossa, if without result, proceed to explore the post. cranial fossa.

On September 20th, patient was operated upon under chloroform.

The canal and the tympanum were found full of polypoid masses, and the mastoid cells and antrum likewise filled with pus and granulation tissue. This region was treated with the sharp spoon. Continuing the operation, the middle fossa of the skull was entered and an *epidural abscess* and a large glistening cholesteatoma evacuated. Puncture of the temporal lobe in several directions revealed nothing but cerebro-spinal fluid which escaped in great quantity. Through a chiselled opening behind the lateral sinus, the posterior fossa was exposed and the cerebellum was punctured with negative result. After this the wound was packed throughout with iodoform gauze and dressed as usual. Pulse after operation, 80.

On the following day, patient was without headache, nausea, or dizziness, and his improvement was uninterrupted. No change was to be seen in the fundus of the eye when it was examined on the second day after operation. On October 10th, the granulating wound was treated successfully by skin-grafting.

The usual course in cases of this kind is for the brain-abscess to pursue a latent course so that our diagnosis is made so late that operative treatment is of no avail. In

this case, however, the symptoms (slow pulse, nausea, dulness, and headache) were present but we found no abscess. This state of affairs is not uncommon in children in whom, in consequence of retention of pus in the middle ear, very severe brain symptoms may be developed, to be relieved as soon as the pus is evacuated. This is supposed to be due in such cases, probably to a secondary meningeal œdema. The name of *serous leptomeningitis* applied to this condition is inappropriate, since there is no infection in the process. We cannot doubt that there was, in our case, an unusual amount of cerebro-spinal fluid since we saw it escape through the dural punctures, and for some time keep the dressings wet.

The epidural abscess cannot be held responsible for the severe pressure symptoms; I have never known slowing of the pulse to occur in a considerable number of cases of epidural abscess which I observed. That symptom points towards brain-abscess, and it was for this reason that I continued my search for a brain-abscess, after opening the epidural collection of pus.

# A CASE OF HOMOLATERAL, ACUTE AFFECTION OF THE AUDITORY, FACIAL, AND TRIGEMINAL NERVES.[1]

By Dr. DANIEL KAUFMANN,

ASSISTANT AT THE EAR CLINIC OF PROF. POLITZER IN VIENNA.

Translated and abridged by Dr. J. GUTTMAN, New York.

PRIMARY affections of the auditory nerve, not caused by external influence (trauma, concussion, etc.), by organic diseases, or by affections of the middle ear, are not often observed. In the majority of such cases both ears are affected, and but rarely do we find unilateral, acute affection of the sound-perceiving apparatus with coincident affections of other cranial nerves.

A man of about thirty-four years of age, always healthy, had never suffered from any affection of the ear, and possessed normal hearing power, was taken ill on July 20, 1896, with general symptoms of malaise, fatigue, loss of appetite, occasional headaches, and evening rise of temperature to 38.4° C. On July 25th the skin of his left cheek became red, covered with small blisters, and was painful. Professor Drasche considered it a case of herpes zoster. On the same afternoon the patient complained of intense headache, great debility, vertigo with recurring vomiting, and was compelled to stay in bed. In the next few days the patient suffered from repeated vomiting, vertigo, intense headache, and slight rise of temperature, but without any apparent affection of the internal organs. On July 29th, paralysis of the left side of face and tinnitus aurium with total deafness of the

[1] Read at the meeting of the Austrian Otological Society, November 24, 1896.

left ear developed. The symptoms then subsided, the fever diminished, the redness and pain of the left cheek disappeared, but the patient still suffered from occasional headaches, total loss of appetite, debility, insomnia, vertigo, and tinnitus.

Dr. Lorenz diagnosticated total paralysis of the facial nerve in all its branches (frontal, orbital, and oral), together with loss of taste on the left half of the tongue (the uvula was not paralyzed) and deafness; the examination of the internal organs and the nervous system proved negative. When I first saw the patient, on August 10th, there still existed a total paralysis of the facial nerve with flow of tears on account of the lagophthalmus. The condition of the ears was as follows: R ear normal; L ear: the auditory canal normal, the drum-membrane was superficially swollen (from repeated instillations of cocaine), but of normal relief. Nasopharynx, Eustachian tube, and mastoid process normal. The patient could only hear with his right ear; this was proven by the fact that on the left side whispering was only audible ad concham, loud speech at hardly ½ *m*, and it was immaterial whether the left meatus was tightly closed or not. The tuning-fork placed on the head was heard only on the right side. On light tapping of the tuning-fork no sound was heard on the left side through air conduction; bone conduction was very greatly shortened (hearing with the other ear?). The patient suffered greatly from vertigo, especially when standing with eyes closed; he could not walk in a straight line, and was unable to stand on one leg.

The patient was ordered to remain perfectly quiet, and was given 1 g. of iodide of sodium daily. On August 17th the general condition had improved, no vomiting, the patient still felt greatly fatigued and drowsy. The facial paralysis improved, the skin on the left half of the forehead could be wrinkled, the eye almost closed, no paralysis of taste. The lower branches of the facial remained affected. The left drum appeared to be perfectly normal, the patient heard whispering voice at a distance of ½ *m*, and loud speech at a distance of 2–3 *m*. In addition to the iodide of sodium injections of pilocarpine were made, commencing with 0.005 at a time. Hearing exercises were instituted. On August 20th, fatigue and drowsiness still complained of; no dizziness; continuous tinnitus in the left ear. The innervation of the oral branch of the facial was improved. Hearing power for loud speech in 3 *m*; Weber constantly to the right. The time of per-

ception for air and bone-conduction, especially for the high notes, was very much shortened.

Ten sub-cutaneous injections of pilocarpine were given up to September 4th; after each injection the secretion of saliva and sweat was increased sometimes with slight nausea, and ardor urinae, which disappeared after a quarter of an hour. The general symptoms gradually improved. The patient was able, though with great exertion and some fatigue, to work in his office for one to two hours. The facial paralysis disappeared on August 27th, but the patient still complained of great debility, little appetite, occasional dizziness, continuous tinnitus and the hearing power remained for whisper at ¼ *m*, for loud speech at 2-3 *m*.

I saw the patient again on November 5th. He was physically greatly improved, and complained of nothing but the continuous tinnitus and feeling of deafness in his left ear. Loud speech heard in about 2 *m*. Weber lateralized to the right (the good ear). Rinne positive for the tuning forks of medium pitch with a decided shortening of the time of perception; a slight tap of $c_4$ was not heard at all on the left side, c only for a short time; no vertigo, even when walking with closed eyes.

We cannot state anything positive, as to the nature of our patient's trouble. On account of the simultaneous affection of the second trigeminal branch (herpes) and of the facial nerve above the giving off of the chorda tympani and on account of the deafness, accompanied with vertigo, we must consider the seat of the disease to be external to the temporal bone, probably in the nerves of the left half of the base of the brain. The acute onset of the disease with fever, the lack of pressure on the brain (ophthalmoscopic examination normal), the normal state of all other cranial nerves, the gradual amelioration of all symptoms, speak against the diagnosis of tumor, aneurysm or hemorrhage. Hysteria can easily be excluded; there is surely no evidence of syphilis. Meningitis (cerebrospinal, epidemic or chronic) could not have existed, because there was no unconsiousness and the symptoms were confined only to one side and disappeared later.

A number of cases of rheumatic deafness have been described in the literature (Bing). Frankl saw among 120

cases of unquestionable rheumatic paralysis of the facial nerve, four cases of simultaneous deafness; in two cases there was in the beginning, total deafness. As there undoubtedly exists a connection between rheumatism and neuritis, it is quite consistent to consider the disease of our patient, as a neuritis, which affected the second branch of the trigeminal, the facial and the auditory nerves. It is true, that neuritis very rarely affects the nerves of the special senses.

The premonitory symptoms, the febrile onset of the disease, the appearance of herpes zoster, the speedy course, and the disappearance of most of the symptoms indicate the case to be one of neuritis. That the function of the ear was not entirely restored, may be explained by the statement of Politzer's, that "taken all in all, the restoration to the normal state is quite rare, owing to the very slight resisting power of the terminations of the auditory nerve in the labyrinth where the process of repair is combined with an obliteration of the function" (Politzer's Text-book, p. 523). On the other hand it is well known that the vertigo may disappear entirely.

Similar affections have rarely been described in the literature. J. Hofmann has published analogous cases in his article, "Contributions to the study of peripheral facial paralysis" (*Deutsche Zeitsch. f. Nervenhlkde*, vol. v., 1894).

In one case after exposure to cold, a bilateral complete facial paralysis set in with fever, and sensory disturbance in both halves of the face. Three weeks later hyperæsthesia of both auditory organs with dimunition of sight due to an optic neuritis developed. These symptoms finally disappeared in part. Hofmann regards this as a case of neuritis multiplex.

In another case after exposure to cold, paræsthesia, pain and a vesicular eruption appeared in the right side of neck and face. This was followed by right facial paralysis, tinnitus and deafness in the right ear. Gradual improvement of all the symptoms.

Hofmann thinks that the deafness in this case is due to an aural catarrh and not to an affection of the nerve itself notwithstanding that the combination of aural catarrh and rheumatic facial paralysis is very rare according to Bernhardt.

Sensory disturbances during the course of a rheumatic

peripheric facial paralysis have long been known to occur. Some authors consider them and the herpetic eruption in the face to be likewise due to the affection of the facial nerve. Dr. Frankl-Hochwart in his monograph, "The symptom complex of Menière's disease," 1895, p. 14-15, describes three similar cases of one-sided deafness with facial paralysis of acute onset. He regards the simultaneous involvement of the seventh and eighth nerves, to be probably due to a process at the base of the brain (rupture of a degenerated artery or a small aneurism).

# REPORT ON THE SIXTH MEETING OF THE GERMAN OTOLOGICAL SOCIETY, HELD AT DRESDEN, JUNE 4 AND 5, 1897.

By Dr. JENS, Hannover.

Translated by Dr. Max Toeplitz, New York.

*President:* Zaufal, Prague.

Siebenmann, Bâle, is elected president for the following year.

*Papers.*

1. Manasse describes **Interglobular Spaces Containing Cartilage in the Human Labyrinthine Capsule.**

2. Kümmel, Breslau.—**New Formations of the Ear.**

Kümmel discusses the granulation tumors which, for the greatest part, comprise the so-called aural polypi apart from true fibromata of rare occurrence. The causes of the tumor-like growth are particularly necrotic substances of different kind, foreign bodies, chemical or mechanical irritations. They consist histologically of granulation tissue with numerous giant cells; frequently of cysts only, foreign bodies, or lymph follicles; are covered with epithelium, become fibrous, and are quite vascular. True angiomata are rare, and are almost exclusively situated upon the auricle and in the external meatus; the same holds true with chondromata and real osteomata. The so-called exostoses are more frequent, partly inflammatory, partly congenital; the latter particularly in races of the New World. They may produce clinically a dangerous condition by retention of pus and have to be operated with the chisel or the burr driven by the electric motor. Benign epithelial tumors are papillomata, which form the boundary line, and adenomata of sebaceous glands, both

of rare occurrence; atheromata and dermoid cysts are more frequent. In close affinity with the latter are cholesteatomata, a part of which are positively primary tumors developed from portions of epidermis, which have in some way entered the petrous bone: endothelial cholesteatomata are extremely rare. The secondary spurious cholesteatoma is anatomically and to a certain degree clinically different. Endothelioma has been observed only in isolated cases upon the auricle and the tympanic mucous membrane; they offer a comparatively good prognosis, but relapse at their original location. Sarcomata rarely originate from the external parts and the acoustic nerve; much more frequently from the petrous bone, and occur in all histological varieties. The most unfavorable prognosis is furnished by the melanotic and round-celled sarcomata. The carcinomata are somewhat rarer, but produce rather less of substance than genuine tumors. The malignant tumors up to the present have rarely been operated upon, although in some, particularly in cancroids, good results might be occasionally obtained.

*Discussion.*—TREITEL presents the specimen of an aural carcinoma, where the sinus was completely pushed aside and the posterior portion of the petrous bone almost entirely destroyed.

BARTH operated four weeks ago on a carcinoma, which had extended far into the deeper parts. During the operation, the semicircular canals were opened; the patient had never complained of pain. With reference to cholesteatoma he mentions two cases, which in chiselling exhibited isolated, small white spots, appeared like miliary tubercles, but proved to be beginning cholesteatoma. Barth believes it to be a degeneration of the cells of the middle ear. LEUTERT holds, that all cholesteatomata have grown into the bone from without.

WALLIZEK has observed a lipoma of the posterior surface of the auricle; chondromata are not as rare as it is believed.

BRIEGER reports a case of angioma with intense hemorrhages. He advocates an attempt at radical operation in carcinoma in spite of the slight prospects. In cancroid of the auricle, local relapses readily take place. Owing to the ready occurrence of concussion of the labyrinth, the operation of exostosis is to be performed only in an emergency, inasmuch as the retention is frequently due to swelling of the soft parts.

KÜMMEL concludes the discussion by pointing out that peritonsillar abscesses occur also in sarcomata. He cannot explain

the multiple small cholesteatomata from remnants of epithelium, and refers to Schwartze's case, in which the cholesteatoma positively did not grow into the bone from without.

3. SCHMALTZ, Dresden. **Etiology of External Otitis, from a Practical Point of View.**

The text-books generally describe two forms of external otitis, the circumscribed and the diffuse ; the latter is usually considered to be caused by a slight injury. According to SCHMALTZ there exists another form, which begins with intense itching, continues with slight pain, presents at the beginning a watery discharge, which later on becomes purulent, and ends with an interval during which intense proliferation of epithelium takes place, whereupon the inflammatory stage returns. The affection is almost invariably bilateral, and is observed particularly in persons suffering from seborrhœa of the scalp and from acne, and is cured only if these affections are treated. Schmaltz, therefore, considers the affections to be a seborrhœa and calls it : Dermatitis externa diffusa seborrhoïca. UNNA believes it to be of parasitic origin, due to micrococci.

Schmaltz then exhibited a patient, who, fourteen years ago, had suffered from an injury to the ear by the bursting of the barrel of a gun. The patient came a year ago, with swelling in the mastoid region. During the operation a portion of the barrel 4 *cm* long and 1 to 2 *cm* wide, was found with two-thirds of its length to be firmly imbedded in the mastoid process.

4. KATZ, Berlin. **Demonstrated Microscopical Specimens.**

The first specimen taken from a bat referrs to the connection of Corti's with Deiters's cells which are here not torn apart ; the Deiters's cell is somewhat shaped like a pair of tongs enclosing a Corti's cell. KATZ believes that the nerve fibres here terminate. A second specimen exhibits the extension of the acoustic nerve in the macula ; the nerve enters the epithelium without the white substance, and separates into fibres, which are contiguous to the cells without entering them. A third specimen is a peculiarly branched cartilage cell, from the cartilage of the Eustachian tube. Katz, also demonstrated several macroscopical specimens of the round window, which showed a heretofore not described excavation under the fossula rotunda. Finally, a specimen of anchylosis of the stapes in sclerosis of the osseous labyrinthine capsule is shown.

5. BECKMANN, Berlin. **Pharyngeal Tonsil and Ear.**

The statements upon the frequency of the pharyngeal tonsil vary between one and twelve per cent. BECKMANN operates in 50 per cent of all his patients, in those with otitis media in 95 per cent. The hyperplasia is due to frequent acute inflammations which are transmitted to the ear. The mechanism of the tube is thus explained. The M. levator opens the lateral portion, the constrictor together with the levator opens the mouth. The pharyngeal tonsil does not close the tube directly, but by suction secretions are likely to enter the tube.

BRIEGER considers the acute inflammation of the pharyngeal tonsil as infectious.

6. FRIEDRICH, Leipzic. **Clinical Contributions to the Study of Aural Affections in Tabes.**

Three views exist, upon aural affections in tabes: 1, an affection of the nerve trunk; 2, disease of the middle-ear, due to an affection of the fifth nerve; and 3, lues may exist. Friedrich, believes it be an affection of the neurones, particularly in the spinal ganglia.

7. ALT, Vienna. **Pathology of Affections of the Hearing Organ Due to Compressed Air.**

ALT demonstrates pictures of specimens obtained from animals. Gas bubbles are formed at the base of the brain, in the brain, mesentery; hemorrhages occur in the inner ear, necrotic foci in the spinal cord, and acute myringitis. In the beginning of the aërial compression, one should open the tubes, in order to avoid negative pressure in the middle-ear and labyrinth; in a dog, as a result the entire tympanic cavity was filled with blood (demonstration of a specimen).

The severest phenomena occur in decompression: gas embolisms.

BEZOLD believes the secondary hemorrhages to be due to the compressed air remaining in the middle ear, which later suddenly escapes. ALT, however, thinks them to be due to the gas bubbles circulating in the blood.

8. SCHEIBE, Munich.—**Two Cases of Fracture of the Petrous Bone.**

A working girl, aged twenty-seven, is hurled aside by a piece of machinery and remains unconscious for a long time; after a week meningitis; death followed in three weeks. Tinnitus appeared on the fourth day after the injury. On the fifth or sixth

day she could hear the voice, but without comprehension. At the autopsy, slight purulent basilar meningitis was found; the osseous fissure extends into the squama. The other petrous bone, which did not exhibit any fissure when examined with the naked eye, presented microscopically after decalcification a fissure traversing the entire petrous bone; the facial canal was struck (without paralysis!). Between the edges of the fissure marked signs of healing were found; young spindle-shaped connective-tissue cells. (Demonstration.)

*Second Case.*—A tinsmith, aged sixteen, falls from the third floor. Loss of consciousness for several days; after sixteen days meningitis, after four weeks fatal issue. On the seventeenth day, when the sensorium happened to be clear, the hearing was examined. In the left ear tinnitus without vertigo; membrana tympani without reflex, in its upper portion slightly injected; loud conversation heard at the distance of 5 *cm.* The patient was operated upon. At the autopsy the operation wound was clean. Purulent meningitis and hydrocephalus internus. Several fissures, one traversing the medial portion of the pyramid, another vertical to the first and parallel with the anterior margin of the pyramid. Membrana tympani normal; in the tympanum and aditus, inoffensive pus. The fissure extends into the foramen lacerum. The microscope shows that the fracture here passes through the cochlea (in the first case through the vestibule), not through its centre, but laterally along the modiolus; horizontal and upper semicircular canal are cut through. Signs of healing quite far advanced; osteoid non-calcified substance; mucous membrane of middle ear inflamed.

SECOND SESSION ON JUNE 5TH.

*Discussion* of SCHEIBE'S paper.

HABERMANN demonstrates photographs and microscopical specimens of fissures of the skull.

BARTH has observed a case, in which the discharge became offensive without an infection.

SCHEIBE points out that the fractures may extend into the nose, whence the infection may originate.

ZAUFAL, in 1864, had published the rules, according to which the direction of the fissures is determined, and finds that the cases communicated at this meeting are in accordance with his views.

9. BEZOLD, Munich.—**Six Additional Cases of Labyrinthine Necrosis and Facial Paralysis.**

Since the publication of his monograph in 1886, BEZOLD has observed six additional cases. The mortality of from 15 to 20 per cent. is now confirmed. Suppuration of the middle ear almost invariably precedes the necrosis. Among three thousand ear patients and five hundred chronic suppurations of the middle ear, one case of necrosis is observed ; in other words, a very rare occurrence. All were neglected cases, which had not previously been treated. The cochlea alone was most frequently affected, particularly the first convolution. The mode of transmission of the inflammation of the middle ear to the inner ear is twofold : 1, either the cells below the labyrinth become necrotic ; 2, or the inflammation extends through the round window. In children, the route differs, probably as extradural abscess. The picture of the disease is as follows : All cases are deaf ; vertigo existed in one case for eight months, in another a year before ; the facial paralysis appears a month later, four paralyses recovered ; in one of the cases even the Fallopian canal could be seen in the sequestrum. The granulations are quite abundant.

The treatment consists of cleansing and removal of the granulations. In one case Bezold performed Wilde's incision, in two cases the radical operation with Koerner's flap. The sequestrum itself ought not to be attacked.

*Results.*—Several cases with epidermoidal cavity, one case with atresia of the external canal.

The examination of hearing is very difficult. Bezold has formerly expressed his doubts of the hearing faculty. He demonstrates tables made according to Hartmann and Gradenigo, which prove beyond any doubt that the apparent hearing power is dependent upon the healthy ear. One table in particular was very instructive, since in the affected ear two tones were missing about the centre of the (apparently !) perceived series, while for these two tones the healthy ear also presented quite a considerable decrease.

10. HESSLER, Halle.—**Caries Sicca Acuta of the Mastoid Process.**

*Report of two Cases.*—A lady had contracted, through scratching, a slight injury to the external meatus ; after two weeks, intense pain. In chiselling, a brownish discolored portion of the bone without injection ; no pus was found. Middle ear normal.

In the second case a similar injury ; after four days the patient urged the operation, which revealed the same brownish discoloration of the bone without inflammatory injection ; the bone toward the antrum was very brittle and appeared lighter. After an intercurrent inflammation of the membrana tympani, and tonsillitis from the fifth to the eighth week, several small sequestra of bone were cast off ; during the sixth week, pyæmic signs without the appearance of pus. In neither case, rise of temperature.

The immediate success justifies and necessitates the operation, which most rationally consists of an early incision into the external meatus.

11. BRIEGER, Breslau.—**Principles for the Medicamental and Local Treatment of Suppuration of the Middle Ear.**

One ought not to be limited to one drug. Acute suppurations of the middle ear are to be left alone as long as the reactions are to be considered as healing processes ; secondary infection from the tube or external canal is to be avoided ; for the removal of pus, peroxide of hydrogen is instilled into the external canal ; the so-called abortive action of carbolized glycerine is probably due to spontaneous recovery.

Chronic inflammations, as a rule, do not spontaneously heal ; irrigations from the external canal seem to be more dangerous than the catheter ; gaseous drugs are not applied, but powders and fluids ; against Stacke's view, the antrum may be reached with fluids, as Brieger demonstrated in the cadaver, when correct position of the head is established, although in pathological cases the passages may be obstructed. The antiseptic remedies act but weakly in albuminous solutions, and are not sufficient to effect a cure. The most efficacious remedy is nitrate of silver. The action of alcohol consists primarily in dehydration. The essential part of treatment with boric acid is said to be the mechanical effect : occlusion of the tympanic cavity and exsiccation ; the former creates certain dangers. Argonin cannot be recommended, according to Brieger's experiments. The province of operative treatment may be limited by these remedies ; different drugs, however, should be used in combination.

*Discussion.*—BEZOLD defends boric acid, aided by the tympanic tube ; osteo-sclerosis acts as protection.

SCHMIDT recommends moist dressing, with aluminium acetate (1 : 4).

STACKE uses boric acid also for after treatment in radical operations, but warns against its use in small perforations, and by the patient himself.

LUCAE recommends formalin, 20 drops in one litre of water.

HARTMANN defends carbolized glycerine.

12. HOFFMANN, Dresden.—**Contribution to the Study of Otitic Sinus Thrombosis.**

A boy, æt. four, suffered since his first year from otorrhœa, at times offensive, but without other symptoms. A week previous to operation, intense pain in and behind the ear, with extensive swelling. Caries and cholesteatoma in tympanic cavity and antrum; large destruction of bone in the posterior wall of the mastoid process; extensive perisinuous abscess. Sinus, not pulsating, when incised was found to be 1 *cm* wide, filled with offensive pus, and obliterated in both directions. Recovery.

*Discussion.* JANSEN, among eight patients, operated for sinus trouble where the sinus alone was attacked; five recovered, three died; among seven operated by way of the jugular, six recovered and one died.

KÜMMEL demonstrates specimens of a resected jugular.

HABERMANN, in one case, incised the sinus, left the firm thrombus untouched, and did not ligate the jugular; recovery.

SCHEIBE has found streptococcus in one half of the cases.

PANSE has observed the penetration of cholesteatoma into the sinus.

13. PANSE, Dresden, demonstrates **A Collection of Ossicles, Removed through the External Meatus, and Preserved in Alcohol in their Natural Position for Subsequent Microscopical Examination.**

For operative interference, the diagnosis of isolated disease of the ossicles, particularly that of the incus, or the implication of the aditus and antrum, is of importance. Isolated caries of the incus is diagnosed: 1, after long treatment of suppuration without benefit; 2, if the removed incus is found to be diseased; 3, if the suppuration is cured after its removal.

PANSE has made schematic drawings of the membrana tympani and found the following signs for isolated caries of the incus: 1, chronic scanty suppuration; 2, perforation in the posterior upper quadrant; 3, with frequent preservation of the limbus in that place; and 4, polypi or pus directly from above. He recommends to perfect and establish the diagnosis of incudal caries by

schematic drawings and thereby promote the indication for the removal of the ossicles.

*Discussion.*—STACKE and JANSEN prefer to precede the removal of ossicles by the radical operation.

PANSE demonstrates the original drawings and serial sections made for his book (*Deafness Due to Rigidity of the Tympanic Windows*, Jena, Gustav Fischer), pointing out the advantageous position of the anterior third of the oval window. The labyrinth is but 1 ½ to 2 *mm* distant from the foot plate, which is at times connected by bands with the utricle; the latter, when stretched, cause vertigo, according to Panse. The facial nerve lies about ½ *mm* laterally and downward, covered by a thick osseous layer. For stopping the hemorrhage from the bone he uses a "Compressor" (demonstration). He presents under the microscope a stapes removed from the living with periosteal proliferation of the vestibular side. In this and in the other demonstrated sections, the cartilaginous plate is always seen to have been removed. In conclusion, Panse advocates experiments to be made in radically operated persons upon the action of the artificial operculum (moist cotton), which are as important as glasses for persons operated for cataract and myopia.

*Discussion.*—HABERMANN reports a case of extraction of stapes; if both windows are obstructed, vibrations cannot take place in the labyrinth.

14. PASSOW, Heidelberg, reports a case, in which, after preliminary tenotomy and subsequent retraction of the auditory canal, a small portion of the lateral wall of the attic was removed, and an opening was made with a protected burr down to the stapes.

The effect was very good; immediately after the operation, no tinnitus, no vertigo; whispered voice perceived through the dressing at a distance of about 30 inches. This condition has persisted. A second case cannot as yet be definitely reported, where all ossicles had been left in place, but an opening had been burred into the labyrinth (at the anterior lower margin of the oval window).

*Discussion* (of the last two papers).—HOFFMANN dissected off the auricle, after an unsuccessful removal of the malleus and incus on account of intense tinnitus; the stapedial limbs were atrophic, and broke off. The tinnitus ceased in the other ear and became intermittent in the operated ear. The deafness was

not improved, but the hearing was impaired in the non-operated ear.

JANSEN has observed in radically operated persons with good hearing power, after ossiculectomy, decrease of hearing faculty for the whispered speech.

ZARNIKO points out that the wall of the Fallopian canal toward the oval window is quite thin.

KESSEL believes that the improvement of hearing after unilateral operation depends upon muscular action.

AFTERNOON SESSION.

15. NOLTENIUS, Bremen.—**Contribution to the Study of the Radical Operation of the Middle-Ear Cavities.**

NOLTENIUS has performed 132 chiselling operations, among which were 107 radical ones, 64 times according to Zaufal and 43 times according to Stacke, with altogether two deaths. Sinus affection and cerebral abscess were not observed. The extraction of the ossicles alone and the use of tympanic tube have yielded but doubtful results. Stacke's operation is not more difficult than Zaufal's. Noltenius has of late again drawn out the *entire* external membranous canal without producing necrosis. He has modified Barth's hook in such a way as to prolong the middle rod by double its length, thus saving an assistant. Temporary paralyses of the facial nerve have occurred in both methods.

Koerner's flap ought to be formed into the concha and its base made 1 *cm* wide. He then passes a drainage tube, 13 *mm* thick, through the external meatus, and uses small pieces of gauze for plugging. The wound behind the auricle is primarily closed with good effect. In particularly favorable cases, the healing may take place in six weeks; the average duration lasts from three to four months.

*Discussion.*—JENS combines Koerner's with Stacke's flap by making the longer longitudinal incision half as long as the upper one, while retaining the transverse incision into the concha.

KOERNER individualizes by using not only his own, but also Stacke's and Panse's flaps.

ZAUFAL speaks against Stacke's operation, which ought to be used only in extreme anterior displacement of the sinus. He operates to the antrum with the chisel and then uses a bone forceps. No perichondritis. Primary suture.

16. WINKLER, Bremen.—**Operative Procedures for the Exposure of the Upper Nasal Accessory Cavities.**

1. The operative field should be extensively laid bare; and 2, without disfiguration.

WINKLER considers the removal of the lower wall of the frontal sinus, according to Jansen, a risky procedure; the frontal sinus and the ethmoid cells cannot thereby be very well explored and treated.

Kuhnt's method, which is designated by many authors as the operation of the future, suffices for the frontal sinus alone; in small frontal sinuses the disfiguration is slight, in larger ones more considerable. Killian's method of temporary resection of bone does not suffice for the exploration of all cavities, and must be combined with Rose's method for the removal of nasal polypi.

If both sides are diseased, the nasal bones should be turned down according to Ollier, or turned upward according to Gussenbauer; the first method leaves a deep scar, and is not well adapted for the accessory cavities. Gussenbauer's method admits a thorough inspection, and excellent final results are thereby attained.

Winkler demonstrates upon a skull the course of the osseous wound; the separation of the bone is performed with the circular saw. Winkler presents photographs of operated persons.

*Discussion.*—BRIEGER does not believe the disfiguration to be extreme in Kuhnt's operation, but the healing not to be permanent. In Jansen's method obliteration takes place.

HARTMANN succeeds in curing empyemata of the frontal sinus in most cases without external operation, in some cases by treatment of the combined affection of Highmore's antrum. The frontal sinus heals often spontaneously after removal of the anterior end of the middle turbinated body and of some granulations and swellings at the entrance of the canal of the frontal sinus. Extensive operations from without are rarely required.

JANSEN produces as much room as possible by exposing through *one* incision many cavities on account of the existence of combined empyemata. He has of late removed the entire anterior wall, whereby he is enabled to reach the posterior ethmoidal cells and the sphenoidal cavity.

WINKLER admits that by this method one may inspect and reach more than by that of Gussenbauer.

17. JANSEN, Berlin.—**Some Conditions Opposing the Radical Cure of Chronic Suppurations of the Middle Ear.**

It is quite difficult to remove the osseous portions forming the wall of the tympanic cavity, particularly in the recessus hypotympanicus. He frequently observed the formation of a fistula in the posterior portion of the tympanic cavity. The tube also is frequently diseased, and therefore the cause of returning suppuration. In abundant development of granulations, scraping with subsequent transplantation frequently leads to recovery. Firm plugging often irritates too strongly. In some cases cicatricial bands are formed, behind which pockets appear; one may then use the chisel. It happens also that the bony surfaces become bent, particularly in the posterior portion of the tympanic cavity.

KRETSCHMANN also intended to discus the lower space of the tympanic cavity. He had operated upon it when diseased, at first with the chisel, later on with burrs, whereby he could better avoid injuries to the facial nerve. An injury to the lower parts is impossible on account of the crista and processus styloideus. He does not operate anteriorly.

18. HOFFMANN, Dresden.—**A Case of Empyema of the Sphenoid Cavity, with Consecutive Disturbance of the Eye of the Same Side.**

The disturbances of the eyes were objective; neuritis optica and paresis of several muscles. Subjectively, there existed a sensation of the eye being pushed aside and of decrease of sight. Operation according to Jansen without disfiguration. Recovery.

19. BÜRKNER, Göttingen, demonstrates an **Otiatric Pocket Case.**

20. JOËL, Gotha, presents a **Cast of Congenital Atresia of the Posterior Nares.**

21. PANSE, Dresden, exhibits a **Foot Button for Contact with Electromotor,** and various **Anatomical Specimens;** also a plainly constructed **Powder Blower.**

22. DENKER, Hagen, presents **Scissors for Adenoid Vegetations.**

23. HABERMANN, Graz, demonstrated a **Table of the Hearing Examination of a Female Patient, who had Become Deaf at Several Intervals in Consequence of Intense Mental Excitement.**

24. DENKER, Hagen.—Demonstration of **Corrosion Specimens of the Mammalian Ear.**

Of especial interest were the casts of the ear of the gorilla, polar bear, seal of Greenland, walrus, great kangaroo, ant-bear, leopard, and water-hog.

25. TREITEL.—**Injections of Pepsin for Improvement of Hearing.**

TREITEL has treated ten cases according to Cohen's method. The result was negative.

# ON TYMPANIC NEURALGIA IN CONNECTION WITH ABSCESS OF THE TONGUE.—REPORT OF A CASE.

By Prof. O. KÖRNER, Rostock.

Translated by Dr. Arnold H. Knapp, New York.

A man, thirty-six years of age, was admitted to the clinic on September 2, 1896. Since his third year, after scarlet-fever, patient has suffered from a bilateral otorrhœa, with occasional pain in the ears. During the last two weeks he has had severe pain in the right side of the pharynx and in the right ear, which has been constant, and so severe that the patient was unable to take any nourishment, and became quite exhausted.

On examination, a glandular swelling, as large as a pigeon's egg, was felt between the right inferior maxilla and the hyoid bone. On slight pressure, the pain in the right ear was increased. The mouth could scarcely be opened. A dark-red, round swelling, as large as a walnut, was situated on the base of the tongue, between the epiglottis and the right anterior palatine arch. The lower two-thirds of both drum membranes were wanting; the tympanic mucous membrane was red, and covered with a slight amount of pus.

The swelling of the tongue opened during the examination, and thick, odorless pus was evacuated. This was soon followed by relief from the pain in the neck and the ear. The gland decreased in size, and the patient was discharged on September 9th.

This case presents various interesting features. First, was the pain in the ear due to the otitis media, or is this a case of tympanic neuralgia arising from the inflammatory process in the tongue? Tympanic neuralgia frequently accompanies

affections of the tongue, especially cancer, where peritonsillar abscesses and ulcerations of the epiglottis are not uncommon. The tympanic mucous membrane was inflamed, and had previously caused pain; but against this origin of the pain is the fact that the pain in the ear was increased on pressing upon the glandular mass. The glands in this locality are involved in affections of the back teeth, as I have been able to observe on myself. About a year ago, I noticed a painful sensation near the extremity of the hyoid bone, which was made severer on swallowing, and radiated to the ear. After filling of a cavity in a wisdom-tooth, the pain disappeared. I have since then repeatedly observed the increase of pain in the ear in case of tympanic neuralgia from carious teeth, on pressure in the hyoid region. I consider this a diagnostic symptom.

Seifert has collected the literature on abscess of the tongue, and has rehearsed the symptoms, but he makes no mention of tympanic neuralgia. In a later observation Escat speaks of this symptom.

It is usually said that tympanic neuralgia from carious teeth is only seen in caries of the lower back-teeth. In the last two years we have paid special regard to this point, and found the supposition correct in all but one case. The upper teeth were frequently affected at the same time. Recently we have observed a case where the otalgia occurred in an affection of an upper tooth alone. The patient had lost all of the lower back-teeth and the second premolar and first molar of the upper jaw were carious.

# NOTES ON A CASE OF MIDDLE-EAR AND MASTOID SUPPURATION IN A DIABETIC PATIENT, WITH REMARKS ON PERCUSSION OF THE MASTOID PROCESS.

By Prof. O. KÖRNER, Rostock.

Translated by Dr. Arnold H. Knapp, New York.

Mr. B., fifty-four years of age, consulted me on April 13, 1895. His previous health was good, though a splenic tumor has existed for nine years without causing any symptoms. Two years ago, the patient had an acute otitis on the left side, which was cured after paracentesis.

On April 3d, without known cause, the right ear became very painful; three days later otorrhœa set in, but the pain has persisted. On examination, I found a rather corpulent man, pale, and with coated tongue. The pulse was rapid, temperature normal. The coverings over the lower half of the mastoid process were œdematous, swollen, and tender. The auditory canal contained blood-stained pus. A pedunculated granuloma projected through a small perforation in the middle of the drum-membrane. The drum-membrane appeared thickened and superficially macerated; the hammer could not be seen.

The pain became less and the discharge more profuse after removal of the granuloma. On April 17th, the mastoid process was still swollen; the perforation was enlarged back and down. Three days later the pain and swelling had disappeared, and the discharge was no longer bloody.

Notwithstanding the local improvement, the patient's general condition failed visibly. The examination of the urine showed the presence of 5 per cent. of sugar, and a small amount of albumen, though the ferric chloride test proved negative. For two

days the patient has been distressed with almost constant singultus. Pulse 120, respiration 24, temperature subnormal. The bacteriological examination of the aural discharge revealed the staphylococcus albus in pure culture.

On April 22d there was no return of the swelling over the right mastoid process, and the *percussion-note over both mastoid processes was exactly similar.* In the following days, the patient's general condition grew rapidly worse, with diarrhœa, attacks of vertigo, and slight delirium. The skin was cold and moist. The discharge from the ear though scanty again contained blood. Three litres of urine were passed in twenty-four hours, and contained $6\frac{1}{4}$ per cent. of sugar. On May 8th the patient was stuporous; pulse 150, respiration 54. The two mastoid processes were alike on palpation. *Dulness on percussion over the right mastoid process, normal bony-resonance over the left.* The patient died in coma on May 8th.

Though we lack the confirmation of an autopsy or an operation, we may say with certainty that this was not a simple suppuration of the ear, but a process of a disintegration within the mastoid process. This is proven not only by the similarity of this case to those described in the literature and by me,[1] but also by the results of the percussion. Whenever the percussion-note of a bone changes from the normal to dulness during our observation and repeated comparison with the percussion of the healthy one, without a change in covering of that bone, some change in the interior of the bone has surely taken place.

In our case, an operative interference was out of the question, owing to the critical condition of the patient's general health.

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[1] KÖRNER, *Arch. f. Ohrenhlk.*, vol. xxix., p. 61. Körner and Von Wild, these ARCHIVES, vol. xxiii., p. 73.

# THE DIAGNOSIS OF PERFORATION OF THE DRUM-MEMBRANE.

By E. BLOCK, of Freiburg.

Translated by Dr. Edwin M. Cox, of New York.

THE diagnosis of a perforation of the drum-membrane belongs, as a rule, to the easy tasks in otology. When the eye discovers in the depths of the auditory passage, a strip of the normal yellowish-white glistening tympanic mucous membrane, or the same membrane reddened, granulating, and covered with pus, it is evident that such can only be the case because there is a defect in the membrana tympani. And when, on the other hand, behind a well defined space in the surface of the membrana, the promontory is seen covered with grayish, dull-appearing, dry epidermis, we think in the first place not of a perforation, but of a depressed cicatrix. Even very diminutive perforations can, as a rule, be easily diagnosticated by monocular vision if they are filled with a drop of fluid such as pus, on the convex surface of which a small light reflex can be seen moving synchronously with the pulse.

There are, however, cases in which this sort of examination is not so easy or certain. Small deposits on the drum, a bit of dark cerumen, a foreign body, a little dried blood, a slight ecchymosis in the tissue of the membrana, or even cicatrices can form a picture which to the examining eye is deceptively like that of perforation. Traumatic ruptures of the drum, which have occurred from indirect violence (sudden and violent changes in air pressure, blows or falls on the head or ear), ruptures which we know heal spontaneously

without suppuration, may present themselves at the time of our observation, in which case we are not in the position to decide from ocular evidence whether there is a perforation, or whether cicatrization is complete.

In doubtful cases, therefore, we made use of other means of diagnosis in determining the existence of a perforation. Frequently, it is possible to gain knowledge by means of the probe. With that instrument, obstructing substances can be pushed aside, and we can convince ourselves as to the intact condition of the drum-membrane. However, it is not advisable to use the probe in those cases in which we expect, with reason, a perforation, especially in traumatic cases, for when the perforation exists, the probe may easily introduce infective germs, and so interfere with the process of repair.

Even for the examination of a depressed cicatrix the instrument is not suitable, because with it we are not able to examine carefully enough the receding sides of the cicatricial cavity.

The probe is of no use in just those cases in which the ocular examination is also untrustworthy, and it has the further disadvantage that touching the drum-membrane in most people is unpleasant or even painful for them. If neither the eye nor the touch gives us the required information, we use the hearing: we direct a current of air against the drum-membrane and listen to the sounds caused by it. The air can be directed either from the auditory canal inwards or from the tympanic cavity outwards; let us consider the former way first.

We fix a rubber bulb in air-tight connection with the auditory meatus. Now, if we squeeze the bulb, no sound is heard if the membrane is intact, but if there is a perforation in the membrane, the air-current penetrates into the tympanic cavity and through the Eustachian tube into the pharynx. While the air is entering the pharynx, a slight crackling sound is heard by the observer if he puts his ear near the nose of the patient, or uses the stethoscope. The occurrence of this sound is proof of the presence of a drum perforation in those cases which we are now considering.

The absence of such a sound is, however, not proof of the

absence of a perforation. In all cases the stream of air does not reach the pharynx. It is not that the wide pharyngeal end of the Eustachian tube is occluded in such cases, but that the lumen of the canal itself may be impassable to the moderate air-current which we may use in these cases. If the air-pressure becomes too great, a fresh yielding cicatrix or an atrophic spot may tear.

In case this procedure is unsuccessful, we make use of the more difficult and less agreeable catheterization. If it is successful, as is usual, the sharp, crackling sound peculiar to the small openings in the drum answers our inquiry in the affirmative, and from a simple blowing sound of air entering the tube we decide upon the absence of any defect. The method is much the most decisive of all, but in many cases is not the less unpleasant for the patient. Even in the most practised hands, the first introduction of the catheter is difficult and painful, and, for the purpose of a simple examination, is of doubtful benefit on this account. We must also remember that there are some cases in which the successful use of the catheter is impossible.

Substitutes for catheterization are not troublesome, but they have not the diagnostic certainty of the classical methods of air-distension.

The recognition of small and obscure perforations with certainty remains desirable. For this by a simple and not disagreeable method, I believe we must thank Siegle's speculum. This little instrument is used specially for observing the movability of the drum-membrane and its separate parts. If we put Siegle's funnel in position and rarefy the air in the auditory canal, in the presence of a perforation no displacement of the drum occurs. With perforations of the membrana flaccida we need not concern ourselves here; they are, perhaps, analogous to the others.

Why there is no displacement is easy to explain. If the drum-membrane is whole and we rarefy the air in the auditory canal, the air in the tympanum remains at a higher pressure, and the drum bulges outward on account of this difference in pressure.

If, however, there is a perforation of the drum, the

rarefaction of the air in the canal causes a corresponding change in the tympanum, and consequently no displacement of the drum. The pressure remains the same on each side of the drum, and the cause for its displacement is not present. It is easy to convince ourselves of the correctness of this view by a simple model made of cardboard and paper in the form of an hour-glass-shaped tube with the membrane at the narrowest part, first with, and then without, a perforation.

# REPORT ON THE PROGRESS OF OTOLOGY IN THE FIRST QUARTER OF THE YEAR 1897.

(*Concluded*)

By Dr. A. HARTMANN.

Translated by Dr. C. Zimmermann, Milwaukee, Wis.

## REPORTS.

New York Eye and Ear Infirmary. 76th annual report, 1896. Ear Department. Drs. Bacon, Dench, Adams, Whiting and McKernon.

New Ear patients, 6485; house patients, 318; operations, 502; paracentesis mem. tympani, 151; removal of carious ossicles, 6; incision of furuncle, 54; mastoid operations, 124; operation for epidural abscess, 6; removal of thrombus of lateral sinus, 2; Stacke operation, 4; adenoids, 32; trephining for temporo-sphenoidal abscess, 2; trephining for lepto-meningitis, 2; trephining for depressed fracture of the skull, 1; excision of fibro-sarcoma of cheek, 1; excision of preauricular fibro-sarcoma, 1.

Gorham Bacon.

Massachusetts Charitable Eye and Ear Infirmary. 71st annual report, 1896. Ear Department. Drs. Blake, Green, Jack and Morse.

New Ear patients, 5545; house patients, 285; operations, incision of membrana tympani, 235; excision of carious ossicles, 18; removal of polypi, 108; adenoid operations, 94; mastoid, 73; trephining of temporal bone and exploratory acu-puncture of brain, 1. Gorham Bacon.

New York Ophthalmic and Aural Institute. 27th annual report, 1896. Ear Department. Drs. Knapp, Tocplitz and Coburn.

New Ear patients, 1393; house patients, 33; furuncle of ext. aud. canal incised, 44; opening of mastoid cells, 23; epidural

abscess, 1; Stacke operation, 1; operation (Kuster's) for thrombosis of lateral sinus, 1; ossiculectomy, 3; paracentesis mem. tym., 51; removal of adenoids, 90.

GORHAM BACON.

BROOKLYN EYE AND EAR HOSPITAL. 28th annual report, Jan. 1897. Ear Department. Drs. Prout, Mathewson, Sheppard and Alderton.

New Ear patients, 3705; paracentesis mem. tym. 18; polypi removed, 26; carious ossicles excised, 8; mastoid operations, 37; trephining of skull, 1; opening lateral sinus, 1; Stacke operation, 1; adenoids removed, 15. GORHAM BACON.

NEW YORK THROAT AND NOSE HOSPITAL. 5th annual report, 1896. Drs. Ramsdell, Reese, Reyling, Kinney and Smith, New Ear patients 171. GORHAM BACON.

NEW AMSTERDAM EYE AND EAR HOSPITAL. 8th annual report, 1896. Drs. Pooley and Myles. New ear patients, 402; house patients, 8; incision of furuncle, 1; paracentesis mem. tympani, 9; removal of polypi, 4; mastoid operation, 1.

GORHAM BACON.

NEWARK CHARITABLE EYE AND EAR INFIRMARY. Annual report for 1896. Drs. Kipp, Rankin, Eagleton and others.

New Ear patients 1504; number of operations, 101; paracentesis mem. tympani, 23; artificial perforation of mastoid cells, 14; removal of polypi, 13; incision of wall of ext. canal, 22; removal of adenoids, 5. GORHAM BACON.

METROPOLITAN THROAT HOSPITAL. 24th annual report, 1896. Drs. Wagner, Hope, and others.

New Ear patients, 920; Removal of polypi, 18; paracentesis mem. tymp., 24; opening of mastoid process, 3; excision of carious ossicles, 5; removal of adenoids, 91.

GORHAM BACON.

ST. MICHAEL'S HOSPITAL, Newark, N. J. Annual report, 1896. Dr. Sutphen.

New Ear patients, 823; operations, 13; operation for mastoid periostitis, 3; opening of mastoid cells, 4.

GORHAM BACON.

THE HARLEM EYE, EAR AND THROAT INFIRMARY. 15th annual report 1896. Dr. Meding.

New Ear patients, 451; removal of polypi, 4; post-auricular abscess, 1; Wilde's incision, 4; removal of adenoids, 30.

GORHAM BACON.

BALTIMORE EYE, EAR AND THROAT CHARITY HOSPITAL. fifteenth annual report, 1896. Drs. Theobald and Murdoch.

New Ear patients 535; opening mastoid process, 1; opening abscess of auditory canal, 10; paracentesis of mem. tympani 3; Wilde's incision, 2; removal of adenoids, 16.

GORHAM BACON.

## MIDDLE EAR.

### *a.* ACUTE OTITIS MEDIA.

22. STILLMAN, F. L. Report of a case of acute purulent otitis media complicated by retropharyngeal abscess. *N. Y. Med. Jour.*, Feb. 6, 1897.

23. EITELBERG, A., Vienna. Periostitis of the mastoid process in acute and sub-acute catarrh of the middle ear, with remarks on transient hardness of hearing in affections of portions of the hearing organ adjoining the middle ear. *Wien. Med. Presse*, 1897, Nos. 12 and 13.

24. HABERMANN, F. On affections of the petrous bone and the labyrinth following acute purulent otitis media. *Arch. f. Ohrenheilk.*, vol. xlii., p. 128.

25. PODACK, MAX, Dr. On the relations of the so-called morbillous croup and the affections of the middle ear following diphtheria to the diphtheria bacillus of Klebs–Loeffler. *Deutsch. Arch. für klin. Medicin.*, vol. lvi., p. 34.

26. LOEWENBERG, B., Dr. Bacteriological and clinical study of a new affection of the ear (auricular pseudo-diphtheria due to streptococci). *Le Bulletin Médical*, No. 19, 1897.

27. NICHOLS, JAMES E. H. Otitis media suppurativa acuta. Mastoid osteitis. Epidural abscess. Operation. Recovery. *Manhattan Eye and Ear Hospital Reports*, Jan., 1897.

22. The case reported was that of a man aged about forty and unmarried. He had had chronic catarrhal otitis media for some years, which was aggravated by a deviated nasal septum. When he first came under the writer's care he had a highly hyperæmic and bulged membrana tympani (left) which had followed a cold. He complained of deep pain in the ear. A paracentesis of the drumhead was performed, and there was an escape of considerable serum. The Leiter coil was applied. Six days later the temperature was normal, and he was allowed to go out on the fol-

lowing day. Four days after this the pain became severe in the ear again, and later the discharge was profuse. For the next two weeks he suffered considerable pain with some hemicrania on the left side. Temperature 103.$^3$. There were, however, no symptoms of mastoid disease. A free incision was made in the mem. tympani in its posterior half, with the idea that there might be insufficient drainage. The pain in the head was temporarily relieved, but on the following day was as severe as ever. The hemicrania was severe, the pain of which seemed to focus at the left side of the vertex and radiate towards the temple. The patient had difficulty in rotating the head, as the muscles in the back of the neck were stiff. He developed some symptoms of cerebral abscess, the pulse becoming very slow, but it was decided at a consultation that the symptoms could be accounted for by a localized meningitis. He was removed to a hospital six weeks after the beginning of the attack. At that time the temperature was normal; pulse 70. There was also some swelling of the neck in front of the sterno-mastoid and at the angle of the jaw. For about a week he had complained of sore throat, and there was some swelling in the left half of the soft palate and subsequently in the naso-pharynx. A diagnosis of retro-pharyngeal abscess was made subsequently and the pus evacuated. The patient finally recovered and the drum-membrane healed. In the writer's opinion, the pus gained access to the naso-pharynx along the sheath of the tensor tympani muscle. GORHAM BACON.

23. EITELBERG reports three cases of acute aural catarrh with periostitis of the mastoid process, which did not heal until after the abscesses were opened. POLLAK.

24. Case 1: death from purulent meningitis after several operations. Suppuration of the labyrinth spreading towards the cranial cavity probably along the vessels of the fossa subarcuata. Case 2: man, aged sixty-nine, with paralysis agitans, died from marasmus eleven weeks after the commencement of the ear affection. No operation had been made. Pus in right antrum and inferior portion of the pyramid. Labyrinth free. Case 3: man, aged sixty-eight, with suppurative otitis media of right ear, ostitis and periostitis mastoidea. Died of pneumonia four months later. The bones of both pyramids very much inflamed, partially rarefied, partially infiltrated with new-formed bony substances. Case 4: laborer, aged fifty-eight, suffered for a month from otitis media and ostitis of the mastoid process of right ear, which led to per-

foration of the posterior wall of the canal. Trephining with removal of the posterior wall both on opening of an abscess in the lower portion of the petrous bone towards the jugular and the sigmoid fossæ. Continuous profuse suppuration. Death from marasmus a month after the first operation. Abscess cavity at the lower surface of the pyramid extending to the condyloid process and the apex of the former, bordering below on the soft parts and on the medial side on the jugular vein. This was a very rare form of secondary abscess, originating in the ear. Case 5 : man of twenty-four years with chronic otorrhœa of right ear and acute exacerbation after taking cold. The affection spread to the mastoid ; vertigo, nausea, vomiting, nystagmus, headache. Bulging of the posterior-superior wall of the canal and perforation of *Mt* at upper posterior quadrant. Yellow foci in some of the pneumatic cells, cholesteatoma in antrum and attic. Radical operation. After that the paralysis of facial and oculomotor nerves on left side, which had existed before, became at first more marked, but then partly disappeared. A persistent fistula in the depth of the cavity, exposed by the operation and surrounded by granulations, was opened later on as far as the wall of the sinus, but unsuccessfully, until finally an abscess cavity in the pars petrosa was opened. A portion of the cochlea became necrotic. The treatment is still continued, and recovery is expected. The very elaborate anatomical and histological details and two further briefly described cases have to be read in the original. BLOCH.

25. PODACK (from Lichtheim's clinic) proves that the croup in measles generally is a diphtheritic affection. In some cases no diphtheria bacilli are found in the pseudo-membranes, but other micro-organisms, mostly streptococci. Therefore pseudo-membranous laryngitis with diphtheria bacilli has to be distinguished from that with streptococci after measles. In one of the cases reported by Podack otitis media of both ears, with diphtheria bacilli without fibrinous or diphtheritic pseudo-membranes in the middle ear, the otitis media occurred two weeks before the other localizations of diphtheria became manifest. Podack admits the possibility that the diphtheria bacilli had nothing to do with the otitis media itself, but may be present only accidentally in the purulent discharge of an ordinary otitis media, acting simply as saprophytes.

In another case perforative otitis media with diphtheria bacilli

of both ears co-existed with diphtheria of the fauces. At the post-mortem examination the mucous membrane of the tympanic cavity was converted into a multicellular granulation tissue, covered by more or less thick membranes, which, in sections, showed diphtheria bacilli and streptococci.

A very fine loose granulation tissue, with an abundant mucous intercellular substance, was found between the osseous tubercula of the right and left cochlea, and around the ganglion cochleare.

From the observations of Podack, the middle ear as well as the nasal cavity appears to represent an ominous haunt of the diphtheria bacilli of Klebs–Loeffler; they invade the middle ear more frequently than is generally supposed, and may remain there for weeks after diphtheria faucium. HARTMANN.

26. LOEWENBERG reports a case of diphtheria faucium with inflammation of the ear after using the nasal douche. Loewenberg examined this patient, who had suffered from excruciating pain for four days. Besides serious general symptoms there was a moderate sero-purulent secretion from the ear, and the meatus was filled with adherent membranes. The bacteriological examination revealed staphylococci in the pharyngeal secretion, streptococci in discharge from the ears, but no diphtheria bacilli. Sections of such a pseudo-membrane from the meatus showed pus corpuscles and streptococci all over. Loewenberg compares this condition with that of a laryngeal pseudo-membrane of genuine diphtheria, and concludes that the aural affection is a special disease, viz., a pseudo-diphtheria of the ear with streptococci, a membranous streptococci-otitis. HARTMANN.

27. The writer reports a case of a female, aged twenty, who had an attack of acute follicular tonsillitis, followed by an acute suppurative otitis media, with pain and tenderness over the mastoid. It was further learned that in a family quarrel the patient had been struck on the right parietal bone with a chair leg. The usual mastoid operation was performed, and pus, broken-down tissue, and carious bone were removed. About two months later the patient was discharged cured. Three weeks later, however, she returned, complaining of great pain in the mastoid region. A sinus was found in the former mastoid wound, extending inwards and discharging pus. The mastoid wound was reopened and enlarged and pus and granulations removed. A week after this, some swelling manifested itself in the scalp above and behind the upper end of the incision. Under ether, an incision was

made down to the bone and a portion of the parietal bone, 1 inch in length by ⅜ inch in breadth was found necrotic and loosened. On removing this, there was a gush of foul-smelling pus of about an ounce in quantity. The dura was thickened, but free from granulations. There seemed to be no connection between this and the wound in the mastoid. The patient recovered.

GORHAM BACON.

### *b.* CHRONIC PURULENT OTITIS MEDIA.

28. GRANT, DUNDAS. Deafness arising from the residia of suppurative inflammation of the middle ear. *The Clinical Journal*, Dec. 28, 1896.

29. BARTH, A., Professor, Leipzig. Concrements in the ear in chronic purulent otitis media. *Monatschrift. f. Ohrenheilk*, No. 2, 1897.

28. DUNDAS GRANT dealt with abnormal conditions, such as losses of substance, cicatricial formations, and desquamative processes, which remain after the discharge has been stopped by treatment, or has subsided spontaneously. The paper is a careful and suggestive one, and exhibits the advances which are being made in the treatment of these cases. A. CHEATLE.

29. BARTH found in the meatus of a child, suffering from chronic suppuration of the middle ear, a plug of cotton covered with calcareous concrements. KILLIAN.

### *c.* CEREBRAL COMPLICATIONS OF PURULENT OTITIS MEDIA.

30. NICHOLS, JAMES E. H. Otitis media suppurativa chronica; otitic brain abscess; operation; recovery. *Manhattan Eye and Ear Hospital Reports*, Jan., 1897.

31. BACON, GORHAM. Remarks on brain abscess in its relation to acute and chronic otitis media. *N. Y. Eye and Ear Infirmary Reports*, Jan., 1897.

32. DENCH, EDWARD B. Intra-cranial complications of suppuration of the middle ear and mastoid. *N. Y. Eye and Ear Infirmary Reports*, Jan., 1897.

33. ADAMS, JOHN L. A case of extra-dural abscess, following a mastoiditis. Operation; recovery. *N. Y. Eye and Ear Infirmary Reports*, Jan., 1897.

34. MCKERNON, J. F. Intra-cranial complications of middle

ear disease, with a report of cases. *N. Y. Eye and Ear Infirmary Reports*, Jan. 1897.

35. STARR, M. ALLEN. The diagnosis of cerebral abscess. *N. Y. Eye and Ear Infirmary Reports*, Jan., 1897.

36. STILLSON, J. O. Report of a case of double mastoid disease, followed by abscess of the spheno-maxillary fossa and neck. Recovery. *Annals of Otol., Rhinol., and Laryngology*, May, 1897.

37. STIRLING, J. W. Thrombosis of the petrosal, cavernous, and circular sinuses occurring in scarlet-fever, and due to acute suppurative otitis media. *Annals of Otol., Rhinol., and Laryngology*, Feb., 1897.

38. BAKER, ALBERT R. Pyogenic brain disease. *Annals of Otol., Rhinol., and Laryngology*, Feb., 1897.

*d.* MIDDLE EAR EXTENSION.

39. BARR, THOS. Case of chronic purulent inflammation of the middle ear on both sides, probably fatal by extension, on the left side, through the labyrinth and auditory and facial nerves to the interior of the cranium, with observations. *Glasgow Medical Jour.*, April, 1897.

40. WILLIS, MORLEY. A case of cerebral abscess, presenting unusual features. *Brit. Med. Jour.*, Feb. 4, 1897.

41. RIDLEY, BROOKE. Cerebellar abscess, following mastoid disease. Death. Necropsy. *Lancet*, Jan. 9, 1897.

42. WOLF, LUDWIG, Dr., Frankfurt a/M. A case of purulent thrombosis of the sinus transversus, with pyæmia, following acute purulent otitis media. Operation; recovery. *Monatschrift. f. Ohrenheilk.*, No. 2, 1897.

43. LACHARRIÈRE. Acute bilateral otitis media, thrombosis of the left lateral sinus, opening of the mastoid process, opening and scraping of the lateral sinus. Recovery. *Rev. hebdom de laryng., d'otol.*, March, 1897.

44. REVIÈRE and ETIÉVANT. Some cases of phlebitis of the sinus and of septico-pyæmia of otitic origin. *Arch. internat. de laryng., d'otol.*

45. LEUTERT, ERNEST, Dr. (from the Royal University Ear Clinic in Halle a/S.). On the value of the lumbar puncture in the diagnosis of intra-cranial complications of otitis. *Muench. Wed. Wochenschr.*, Nos. 8 and 9, 1897.

30. The history of this case was that the girl, aged thirteen years, had had chronic otorrhœa (both ears) for several years, and three weeks ago she seemed to have an acute attack of pain in both ears with some mastoid tenderness. There was discharge from both ears of foul-smelling pus and some granulations in the canals. Later there occurred drowsiness, a slight rise in the temperature, slight vomiting, slow pulse, slight facial paralysis (left side). Eight days after she entered the hospital she was etherized and a crucial incision 5 *cm* in length was made over the right temporal region above the temporal ridge. A button of bone was moved with the trephine and the dura found healthy. On enlarging this opening forward and downward, a quantity of thin, very offensive pus escaped. The dura was incised, and about two ounces of pus evacuated from the temporo-sphenoidal lobe. The cavity was washed out with a hot boric acid solution and a soft drainage tube inserted. The patient recovered. At the time of her discharge from the hospital there was a cerebral hernia at the site of the operation, which gradually diminished under the pressure of an elastic bandage worn continually. She left the hospital in February, and in August the writer received notice of her death, the cause of which was supposed to be due to some acute intestinal attack, although NICHOLS failed to obtain specific information. GORHAM BACON.

31. The paper consists in a brief review of five cases which have already been reported, viz., three cases of temporo-sphenoidal abscess, one case of cerebellar abscess, one extra-dural abscess.

In addition to these, a case of "probable cerebellar abscess" is given, as follows: A little girl, five years of age, who had had a chronic otorrhœa of two years' duration. Several months before this the child commenced to vomit, and for a week or so could retain no food. The vomiting was more or less constant until the time that she first came under observation. The child then had double-choked disc with retinitis. She had a staggering gait and could stand with difficulty when the eyes were closed. The canals were filled with pus and granulations. The latter were scraped away and free drainage established. The child was given iodide of potash and syr. of the iodide of iron. Under this treatment the child practically recovered. Of the five cases reported, in one the temperature was high and the pulse accelerated. In another case, besides a rapid pulse, there was such a fluctuation in the temperature that the case seemed at first to be one of

lateral sinus thrombosis. In two of the cases there was but a slight elevation of temperature and a slow pulse. In the three cases of temporo-sphenoidal abscess, aphasic symptoms were marked. In only two of the cases was there inflammation of the optic nerve. In all cases severe headache was a constant symptom. In the three cases of temporo-sphenoidal abscess and that of cerebellar abscess the mastoid process was very dense.

The antrum should be opened first of all in a case of brain abscess and made the starting-point for further investigation. The operation should be performed as rapidly as possible and undertaken at an early stage, if success is to be attained.

GORHAM BACON.

32. DENCH reports five cases, two of which were published in the *Transactions of the American Otological Society* for 1896. Of these five cases, one was that of a man, about twenty-two years of age, who gave a history of chronic suppurative otitis of long duration. The mastoid was carious, and it was necessary to open the lateral sinus and to remove a thrombus. The sinus was packed with gauze. The patient recovered.

The second case was that of a man, about thirty years of age, who complained of severe pain about the left ear. Inspection of the drumhead gave negative results, and for six weeks various procedures were adopted but without any benefit. At this time there was tenderness over the mastoid. Temp. 99° F. Antrum was opened and bone found softened. The lateral sinus was exposed and found empty. The bone along the sinus was removed down to the jugular fossa. "The patient had evidently suffered from a localized purulent meningitis, the infected area having been shut off from the general cranial cavity by adhesive inflammation." Recovery followed.

A third case was that of a child, two months old, who had an acute suppurative otitis media. The mastoid became involved. The abscess was opened and the antrum reached. There was extensive caries, so that it was necessary to expose the dura. For the next four days the condition of the patient was improved except that the temperature was high. On the fifth day the child seemed dull, and on the following morning signs of left facial paralysis were noted. The opening was found in the dura, and some thick pus was evacuated from the brain itself. Improvement in the child's condition was but temporary. The patient died. No autopsy could be obtained.

The two cases previously reported were both successfully operated upon. One was that of a young man, eighteen years of age who had chronic sup. otitis media. On opening the mastoid, which was carious, there was found thrombosis of the lateral sinus. The thrombus was removed. The other case was one of infective lepto-meningitis following a chronic middle-ear suppuration in a man sixty years of age. GORHAM BACON.

33. The patient, a man, fifty-five years of age, was seen November 7, 1895. He had a chronic suppurative otitis media of five months' duration. There had been severe pain for some time about the ear and for the past ten days there was marked swelling and tenderness over the mastoid. There was a profuse discharge from the ear, and the posterior wall was swollen and boggy. The drumhead was mostly destroyed. Temp., 100.2° F. The mastoid was opened. The antrum was filled with pus and granulation tissue. A communication was established with the middle ear. The temperature remained above normal for several days after the operation. The wound was healed on January 1, 1896. On January 14th, however, the patient returned, as the sinus over the mastoid had reopened and he began to have severe pain in the side of head extending to the frontal region. As the pain persisted and there was a free discharge of pus from the sinus, a further operation was undertaken on January 30th. A free incision was made, so that the whole mastoid process was exposed. The sinus was found to extend to the dura. The latter was found thickened and covered over with a thick fibrinous exudate over a space two by three inches in diameter. Granulation tissue was removed. An aspirating needle was plunged into the brain, but no pus was found. In reporting this case, ADAMS says that it is his object "to emphasize the fact that in removing diseased tissue great care should be taken to remove it all, and avoid the danger which may result from a neglect to do so." He further thinks that "had he made a more thorough investigation and removed more of the remaining diseased tissue, the probability is that a second operation would not have been required." GORHAM BACON.

34. CASE 1. Thrombosis of lateral sinus complicating acute mastoiditis due to middle-ear suppuration; operation; recovery.

The patient, a young man, seventeen years of age, had an otitis media of five weeks' duration, followed by mastoid inflammation (right). Later he had a chill, high fever, and vomiting. An

ice-coil was applied, and some improvement followed for a time, but when seen by McKernon there was a copious discharge from the canal through a small opening in the drumhead. There was bulging of the drumhead. There was also tenderness over the mastoid. A free incision was made in the mem. tympani and the Leiter coil applied. It was necessary, however, to open the mastoid cells. Pus was found in the antrum. The pneumatic spaces were completely broken down even to the tip. The sinus was exposed and opened, and found to contain a thrombus. A free flow of blood was established at each end of the incised sinus. The patient made an excellent recovery.

Case 2. Epidural abscess following chronic mastoiditis due to middle-ear suppuration ; operation ; recovery. The patient was a Russian, aged fifteen, who had an attack of scarlet-fever a year previously, followed by meningitis. As a result he was a deaf-mute. When six years of age he had a discharge from both ears, and later a swelling behind the right ear. When he came under the writer's observation, there was a very small and contracted meatus and canal. Behind the ear (right) was a large, boggy swelling in the mastoid and a sinus below at the tip. The boy's condition was serious. Under ether, a free incision was made over the mastoid process. The latter was found broken down and necrotic, and only the inner table of the tip was present The wall between the antrum and the lateral sinus was necrotic and this was removed. The middle central fossa was opened and an extra-dural abscess found. The wound healed com pletely, and there was no discharge from the ear. The hearing was negative.

Case 3. Epidural abscess following acute mastoiditis; oper ation; recovery. The patient, a man, aged thirty-one, had suf fered from chronic otorrhœa for some years. He contracted a cold, and the discharge from the ear ceased while symptoms of mastoid disease developed. He was admitted to a general hospital, where the mastoid process was opened. Later he came under the writer's care, at the Eye and Ear Infirmary. Here the mastoid cells were thoroughly exposed and all diseased tissue removed. Directly over the centre of the lateral sinus the bone was very soft, and pus was found beneath its surface. The patient recovered. Gorham Bacon.

35. In this paper Starr first refers to cases of brain abscess due to traumatism that have come under his observation, and

afterwards to cases of abscess following disease of the ear. The writer says that "in the diagnosis of abscess of the brain the combination of the symptoms, rather than the existence of any one symptom, is of the greatest aid." In the preliminary period, paroxysmal pains and a dull ache in the head, occasional vomiting, and a lack of power of concentration, with mental fatigue developing easily and unusually, are the chief symptoms. During this period there may be chilly sensations or a distinct chill, with rise in temperature. The discharge from the ear may be copious or very scanty. Sometimes the discharge ceases suddenly. A sudden cessation of the discharge and a sudden fall in the temperature to a point below normal two or three days after the discharge has ceased are symptoms quite characteristic of the formation of an abscess, especially if the patient continues to feel ill with indefinite cerebral sensations. In the second stage the symptoms usually observed are increasing mental stupor, irritability, restlessness, general septic appearance of the patient, with irregular or low temperature, persistently slow pulse, serious disturbance of digestion, difference in the size of the pupils, optic neuritis, facial palsy, increase of reflexes in the limbs of the side opposite to the lesion. In abscess of the temporo-sphenoidal lobe of the left side a certain form of aphasia, called optical aphasia by Freund, is a most important symptom when present. This consists in an inability to name objects which are seen and recognized, and whose use can be described. Prof. Arnold Pick has described fully this symptom of optical aphasia, and made it the basis of a diagnosis of localization of a cerebral abscess, which the operation confirmed. In left-handed persons this symptom will occur in abscess of the right side.

Starr concludes by saying "that when a cerebral abscess seems probable from the history of a case and from the symptoms which have developed, it is advisable to operate, even though the symptoms may not be absolutely typical, and may present many variations from their usual form, provided the general progress of the case demonstrates the existence of an increasing and serious focal disease of the brain. The rapidly increasing percentage of recoveries after operation warrants a degree of boldness, provided the surgeon is careful in the observance of every rule of asepsis, without which precaution such a venturesome operation would be criminal." GORHAM BACON.

36. The case reported was that of a woman, of middle age, who

had an attack of influenza in February, 1896. Shortly afterwards both ears became affected. At first a free incision was made in each drumhead and antiphlogistic treatment carried out. It became necessary, however, to open both mastoid processes. The case was further complicated by an abscess in the antrum of Highmore. Pus burrowed down beneath the sterno-mastoid muscle, and it was necessary to open an abscess deep down underneath this muscle. The result in this case was that good hearing was obtained, and the patient's health a year afterwards was excellent. GORHAM BACON.

37. STIRLING'S patient, a boy, seventeen months' old, developed acute suppurative otitis media during an attack of scarlet-fever. The left ear was affected, and the tissues over the mastoid antrum were œdematous. An incision was made through the tissues, and a portion of the posterior wall of the external meatus cut away. Three days later œdema of the left upper eyelid developed, and one day later the right upper eyelid began to swell. The child became comatose. The temperature fluctuated very much, rising as high as 104.6° F. Death occurred. There was found at the autopsy thrombosis of the left sup. petrosal sinus, the cavernous, and circular sinuses. GORHAM BACON.

38. In this paper BAKER gives a report of sixteen cases of cerebral disease following disease of the ear. Of this number, there were eight cases of cerebral abscess, with three deaths; five cases of sinus thrombosis, with one death; three cases of meningitis, all of which were fatal. The writer says that so far as possible "the infective area was cured by curetting and draining," and further that "the boldness with which the general surgeon opens the cerebral cavity in his efforts to discover and drain cerebral abscesses, and the perfunctory way in which he passes over the source of the infection in the middle ear, is a dangerous practice."

GORHAM BACON.

39. A boy, aged seventeen years, who had suffered with discharge from both ears for seven years, came to BARR in 1894. A perforation in Shrapnell's membrane on each side was found, and, as little effect was produced by ordinary treatment, Barr proposed to open and clear out the antrum and attic on the left side, which was the one more seriously involved. This proposal did not gain the assent of the parents. The patient came again in September, 1896, with intense pain in the left ear and side of

head, and profuse and offensive discharge on both sides. There was buzzing in the left ear, in which a polypus was found; occasional giddiness was complained of. The hearing for a 70-inch watch was 10 inches on the right side and 0 on the left. The polypus was removed under chloroform, and a carious condition of the posterior meatal wall found. The antrum and attic were opened, and cleared of cario-necrotic débris, granulation tissue, and cholesteatoma. Improvement for a few weeks followed these procedures; but slight headache in frontal and occipital regions then came on, and a temp. of 100°. The boy then became suddenly ill with violent sickness, delirious excitement, and a temp. of 102°. Nicoll then opened the cranium, exposing the sigmoid sinus and the dura mater of the middle fossa, but nothing was discovered. Some improvement followed, the temperature became normal, and the child looked better, but left-sided facial paralysis was noticed. Examination of the eyes by Thomson showed the right disc slightly hyperæmic; the left disc very hyperæmic; physiological cup obliterated, upper and lower edges obscured; the whole disc prominent; the surrounding retina somewhat œdematous. The left eyeball appeared rotated upwards relatively to the right. Diplopia was present, chiefly marked in the middle line, consisting of a lateral and vertical element. A week later the patient suddenly became gravely worse, with delirium, unconsciousness, rapid pulse, and temp. of 104° to 106°; death occurring within eight hours. At the post-mortem the left temporal bone showed part of tympanic wall of labyrinth destroyed by caries, perforation in upper part of membrane, with loss of incus and stapes. A large cavity lined by soft membrane occupying the petrous part continuous with the antrum, the result of necrotic destruction of the whole labyrinth; the only trace of the labyrinth being a small, loose sequestrum consisting of a portion of the cochlea. In the roof of this cavity, corresponding to the position of the cochlea, was a carious opening, penetrating the bony floor of the middle fossa, covered by healthy dura mater. The cribriform lamina eroded away, the auditory nerve presenting an abrupt and ragged ending, the stem being much thickened. The facial nerve in the internal meatus was inextricably united with the auditory and sharing its thickening and swelling. At the geniculate ganglion the nerve was denuded of its bony covering by caries, and at the posterior part of the inner tympanic wall the nerve was entirely destroyed. In

the cranium the dura mater was normal, but in the meshes of the pia arachnoid on the concavity of the cerebrum was an extensive fibrinous exudation; the same condition existing at the base of the brain. On the posterior part of pons and anterior part of medulla, both on the left side, the exudation was very marked, entangling the 6th, 7th, 8th, 9th, and 10th nerves. At the hinder part of the cerebellar hemispheres the exudation appeared in little elevated masses. The cerebellum, where overlapped by the 7th, 8th, and 9th nerves at the anterior part of the lateral lobe, just as it lies in contact with the posterior surface of the pars petrosa, was superficially ulcerated, and fœtid pus was seen to extend mesially and deeply into the cerebellar tissue.

40. WILLIS reports a case which was under Chalmers Norton's care. A child, of eight years, who, after an otitis media suppuration developed symptoms of meningitis, which gave place to those of cerebral abscess. The abscess was found and drained. On two occasions in attempting to replace the canula in the cavity, arterial blood was forcibly ejected. Recovery occurred.

ARTHUR CHEATLE.

41. In RIDLEY'S case a boy, aged fourteen years, had suffered with discharge from the right ear for seven years after an attack of measles. Symptoms of mastoid trouble supervened, and an abscess formed behind the ear; on opening the abscess a carious track was found leading to the antrum. Improvement occurred, but later the child, became seized with rigors, diarrhœa, and vomiting. These symptoms, with the exception of the vomiting, were replaced by subnormal temperature, slow pulse and respirations, slow cerebration, staggering gait, constipation, and extreme tenderness over the right occipital region. Cerebellar abscess was diagnosed, but the parents refused operation. No optic neuritis or ocular paralysis noticed all through. Death occurred suddenly. At the post-mortem examination a large abscess was found in the anterior and outer portion of the lateral cerebellar lobe. No meningitis. Lateral sinus normal. CHEATLE.

42. The operation was performed when the pyæmic symptoms had just begun. The sinus contained a sanguinolent purulent fluid and thrombotic coagula, not offensive. In removing them, a hemorrhage occurred from the peripheral portion of the sinus, which was stopped by tamponades. No ligation of the external jugular vein. In the further course metastatic abscesses supervened on the left upper arm, neck, and above the right sterno-

clavicular joint. The abscess of the neck was deeply situated behind the sterno-cleido-mastoid muscle, contained very offensive pus and gas, and probably originated in the internal jugular vein. KILLIAN.

43. Bilateral otitis in a child, aged twenty-two months, with perforation on the fifth day. On the 10th day chills, on the 11th day inflammatory œdema of the left upper eyelid, on the 15th day operation. Pus was found in the antrum and a bland thrombus in the sinus. Scraping and cleansing; recovery. ZIMMERMANN.

44. The three cases observed by the authors ended fatally. The mastoid process had been opened and scraped as far as the sinus, without ligation of the jugular vein. In the fourth case a fistula was opened which had existed for months, leading into the sinus. The sinus was obliterated, and consisted of "fibro-caseous" material. The authors add some remarks on the diagnostic difficulties of such cases, and call attention to a new pathognomonic symptom, viz., the occurrence of profuse hemorrhages from the meatus. ZIMMERMANN.

45. The puncture of the lumbar vertebral column, described by QUINCKE, was performed on twelve patients in all, in the ear clinic at Halle. In all five cases of diffuse purulent meningitis (of which three were complicated by thrombosis of the sinus or cerebral abscess) the liberated fluid was opaque. The same was found in a case of epidemic cerebro-spinal meningitis, but it showed more micro-organisms than the other cases. In a case of serous meningitis (clear œdema of the pia mater), the fluid was not perfectly clear, but contained rods, which, perhaps, might be taken for accidental impurities. Only in a case of encapsulated meningitis (complicated with thrombosis of the sinus and cerebral abscess) and a case of tubercular meningitis the fluid, obtained by punctures, was perfectly clear. In the latter, however, it was opalescent, but no tubercle bacilli of Koch could be found. In the remaining three cases of thrombosis of the sinus, or perisinuous abscess (this case recovered) and cerebral abscess, which were not complicated with meningitis, a clear fluid was obtained by this puncture.

In one case the puncture and aspiration were followed by immediate death, as observed before by other authors. LEUTERT is fully aware of the danger of a puncture in advanced cases of cerebral tumors and meningitis, but thinks it to be of no practical

consequence, since the patients are doomed. [This, however, does not hold good in cases of cerebral tumor.—Reviewer]. Further observations must show how cases of cerebral abscess and thrombosis of the sinus will be affected by it. The dangers of the puncture may probably be diminished by manometry.

The authors so far considered, almost without exception, the positive symptoms. Leutert, however, emphasizes, that in otology the chief stress has to be laid on the negative symptoms which exclude diffuse purulent meningitis, at least when *large* quantities of fluid are present, and thus facilitate the diagnosis of the remaining intracranial complications.

In the uncomplicated cases the fluid was clear, but its quantity increased. From reasons given in the *Archiv. für Ohrenheilkunde*, vol. xli., the author thinks that, if these conditions proved generally to accompany the thrombosis, the diagnosis of thrombosis of the sinus could be made with certainty from the increased pressure associated with high fever. The lumbar puncture may also support the diagnosis of cerebral abscess.

Pathologically, the formed elements of the fluid drawn off are most important. The author thinks that not only the presence of polynuclear leucocytes, but also an increase of the number of leucocytes make the diagnosis of meningitis at least very probable. In regard to micro-organisms, the simple microscopic examination is more important than cultures or experiments on animals.

The patients were always laid on the side in performing the puncture. Leutert recommends to have needles ready of a length up to 13 *cm*, as in one case a length of 7 *cm* proved insufficient.

The reviewer observed a case in which this diagnosis was corroborated by the lumbar punctures. It was followed by a remarkable, but transient, improvement, contrary to the experience made in the clinic at Halle. SCHEIBE.

### *d.*—OTHER AFFECTIONS OF THE MIDDLE EAR.

46. BRUCHL, Dr. E. On the treatment of adhesive processes of the middle-ear with thyreoidin. *Monatsschrift f. Ohrenheilk*, No. 1, 1897.

47. KOERNER, Prof. O., Rostock. Remarks on tympanic neuralgia in connection with the report of a case of abscess of the tongue. These ARCHIV., vol. xxvi., No. 4.

48. ALDERTON, H. A. Toxic paralysis of the chorda-tympani

nerve in middle-ear operations from the use of strong cocaine solution. *Annals of Otol., Rhinol. and Laryngology*, Feb., 1897.

49. COWEN, WILLIAM. A case of objective tinnitus of the ear. *N. Y. Eye and Ear Infirmary Reports*, Jan., 1897.

50. DUEL, ARTHUR B. The rapid dilatation of strictures of the Eustachian tube by electrolysis. *N. Y. Eye and Ear Infirmary Reports*, Jan., 1897.

46. Out of 16 cases 8 remained in the same condition after six to eight weeks' treatment; in 4 there was an improvement of hearing; 2 yielded very good results, viz., an improvement of from $\frac{1}{2}$ to 7 *m* for loud speech and from 10 to 100 *cm* for the acoumeter. BRUCHL attributes the result to the action of iodine contained in thyreoidin. KILLIAN.

48. ALDERTON reports a case of paralysis of the chorda-tympani nerve, which he believes was due to the action of a strong fresh solution of cocaine hydrochlorate, which had spread so as to involve the nerve in its influence. The paralysis persisted for less than twenty-four hours, and disappeared without sequelæ. GORHAM BACON.

49. In this case the drumhead was found normal as well as the hearing distance. A diagnosis of aural catarrh was made and the patient treated in the usual way, as there was a surging noise in his ear. A clear musical note could be heard on applying a stethoscope to the auricle, or better by inserting a rubber tube into the auditory canal. The note was synchronous with the heart beat, and could be stopped every time by making slight pressure upon the carotid vessels. The sound was only heard through the auditory canal, and was undoubtedly produced by some circulation error. The patient was about forty-two years of age, and in good health. A careful examination for valvular anomalies or aneurismal conditions of the large vessels was made without any results. GORHAM BACON.

50. The writer in this paper reports the results obtained in ten cases of stricture of the Eustachian tube. He describes at length the apparatus used, which consists of copper bougies which are passed through silver catheters. The Eustachian tube is bougied in the usual manner, the tip being pushed forward until it is felt to be obstructed by the constriction. The current is then turned on slowly, until from two to five milliamperes are used. After a contact of from two to five minutes the bougie is felt to pass on through the softened stricture with a slight pressure. GORHAM BACON.

NERVOUS APPARATUS.

51. KAUFMANN, Dr. DANIEL. On a case of complete deafness of both ears three days after a fall on the occiput. Contribution to the study of concussion of the labyrinth. *Wien. Medic. Blaetter*, No. 1–4, 1897.

52. HOLINGER, J. Diseases of the labyrinth. *Annals of Otol., Rhinol., and Laryngology*, May, 1897.

53. KAUFMANN, Dr. DANIEL. On a case of monolateral acute affection of the 8th, 7th, and 5th nerves. These ARCHIVES, vol. xxvi., No. 4.

51. A boy, aged thirteen, fell on the occiput while exercising in the gymnasium. Vertigo, consciousness preserved; in the following two days vomiting, headache; on the third day sudden deafness of both ears. The examination revealed infraction of the right parietal bone with hæmatocele (meningocele spuria), and complete deafness on both sides. KAUFMAN diagnosed an affection of the labyrinth due to cerebral concussion, excluding a central or medullar affection, as well as a fracture of the base of the skull on both sides. He attributes the secondary deafness to a so-called secondary traumatic apoplexy (Bollinger, Michel).

Extensive literature on the condition of the hearing organ in injuries of the skull. POLLAK.

52. HOLINGER reports three cases of traumatic disease of the labyrinth. The first case was that of a man, twenty-six years of age, who three years previously was thrown from his horse. He was unconscious for some time afterwards. He then complained of great deafness and dizziness. After some weeks there was improvement, and he was able to hear loud conversation.

The second case, a man, forty-five years of age, attempted suicide by shooting himself in the left ear. He developed a staggering gait in walking. There was also great deafness and complete paralysis of the muscles of the left side of the face. The drumhead was destroyed, and the bullet was found in the middle ear. From the position of the latter, it is probable that the cochlea and greater portion of the vestibulum were destroyed.

The third patient, a man, nineteen years old, fell a distance of sixteen feet, and was unconscious for two weeks. He had great dizziness and subjective noises. There was a discharge of pus from the ear. Subsequently tenderness over the mastoid de-

veloped. There was probably a fracture through the labyrinth. The patient was very deaf, and bone-conduction was lost.

GORHAM BACON.

## NOSE.

### *a.*—GENERAL PATHOLOGY OF THE NOSE.

53. PLAGET. On the protection of the nasal cavity against invasion of micro-organisms. *Ann. des mal. de l'or., du lar.*, Feb., 1897.

54. VAUSANT, EUGENE L. Bacteriological investigations of the nasal mucus in one hundred cases of chronic nasal discharge. *Journ. Amer. Med. Assoc.*, Feb. 27, 1897.

55. MEYER, EDMUND, Berlin. Bacteriological conditions in rhinitis fibrinosa. *Arch. f. Laryngol.*, iv., 2.

56. PRIBARY. Clinical and anatomical contributions to rhinitis sicca anterior. (From the polyclinic of Prof. Siebenmann at Basel). *Archiv. f. Laryngol.*, iv., 3.

57. LACOARRET. Anatomy and pathology of the inferior turbinated body, its hypertrophy, and benign degenerations. *Rev. hebdom. de laryng. d'otol.*, Feb., 1897.

58. BRONNER, A. Asthma and hay fever of nasal origin. *The Medical Press*, Jan. 27, 1897.

59. LUZATTI. On a light form of psychical excitation due to an endo-nasal operation. *Ann. des mal. de l'or du larynx*, Feb., 1897.

60. LANGE, Dr. VICTOR. On adenoid habitus. *Berl. Klin. Wochenschr.*, No. 1, 1897.

53. PLAGET confirms Lermoyez's assertion of the bactericidal action of the nasal mucus. Cultures from mucus of the posterior portions of the nose remained sterile, and nasal mucus added to bouillon cultures of various micro-organisms checked their growth. The experiments are briefly reported.

ZIMMERMANN.

54. Among a hundred patients with chronic nasal catarrh examined bacteriologically, the diphtheria bacilli were formed in thirty cultures of twenty-six different patients, of which eleven were cases of atrophy, three of chronic suppuration, five of chronic rhinitis, three of syphilis, one of acute rhinitis, and three of chronic hypertrophy. M. TOEPLITZ.

55. After giving the clinical differential diagnosis of rhinitis fibrinosa and rhino-diphtherica, MEYER reports the results of the bacteriological examination of twenty-two cases of fibrinous rhinitis. He found in nine cases the ordinary nasal bacteria, streptococci, of no great virulence, and staphylococci (albus and aureus); in thirteen virulent diphtheria bacilli.

There being no clinical difference between the cases with and without diphtheria bacilli, Meyer concludes that rhinitis fibrinosa is etiologically not a disease proper, but a symptom of an infection due to diphtheria bacilli, or other micro-organisms, particularly streptococci and staphylococci. ZARNIKO.

56. PRIBARY sums up his investigations in the following manner: 1. Rhinitis sicca anterior is an atrophic rhinitis sicca of the cartilaginious system. The xanthosis of Zuckerkandl is one of its features. 2. It is the chief etiological movement for habitual epistaxis and perforating ulcer, probably also for the easily bleeding polypus of the septum. 3. Rhinitis sicca anterior predisposes the nose to infection by tuberculosis, syphilis, erysipelas, and suppurative perichondritis septi. 4. Histologically the mucous membrane contains numerous cells in the process of hyaline degeneration, "Mastzellen," and few eosinophile cells. 5. Very much pigment within and outside the cells, originating from the blood, shows characteristic red-brown color when stained with carbol-fuchsin. 6. A peculiar substance covering and infiltrating the superficial cellular layer is found in the mucus of the altered mucous membrane, the ciliated epithelium of which is transformed into pavement epithelium with a corneal stratum. This substance reacts to staining fluids like kerato-hyaline, and its decomposition probably is the cause of the characteristic odor of the atrophic nasal mucous membrane. [The reviewer never noticed this odor in rhinitis sicca anterior or perforating ulcer]. It covers the mucous membrane like varnish, and by spreading into the uppermost layer of the cells, it probably causes the vulnerability of the mucous membrane. 8. The normal septum has only a small area of pavement epithelium at the junction of the mucous membrane and the epidermis, otherwise it has ciliated stratified epithelium. ZARNIKO.

57. LACOARRET claims an anatomical difference for the lower turbinated body from the others; not only because it develops from a separate bone, but also because it is characterized by its stratified epithelium, its dense cavernous tissue, and its abun-

dance of lymphoid tissue. The same difference exists clinically; the smooth and papillary hypertrophy and the myxomatous and fibromyxomatous degeneration are met with only on the lower concha. ZIMMERMANN.

58. At a meeting of the Bradford Medico-Chirurgical Society, held on January 12, 1897, BRONNER related that asthma and hay fever may be of nasal origin.

1. As a direct result of nasal obstruction.

2. As the result of irritation of the endings of the 5th nerve by polypus, atrophy, or hypertrophy of the nasal mucous membrane, foreign bodies, or by necrosis of bones of the nose.

3. As the outcome of a central neurosis, in which case the cautery gave relief by acting as a counter-irritant.

He advocates examination of the nose in all cases.

ARTHUR CHEATLE.

59. Psychical excitations, of one day's duration, occurred in a hysterical woman, aged thirty-five, after removal of a hypertrophied portion of the lower turbinated body—without cocaine. ZIMMERMANN.

60. LANGE asserts that the "adenoid habitus," at first described by Meyer, is not absolutely pathognomonic of adenoid vegetations. Quite a number of patients did not lose this habitus even after removal of the pharyngeal tonsil with improvement of nasal breathing and speech. Others show adenoid habitus who never had adenoid vegetations. Although these children, who also show neuropathic symptoms, belong to the typical cases of Meyer, they generally are partially or totally degenerate from birth, some of them exhibiting external symptoms of degeneration (abnormally developed skull, etc.). The adenoid habitus of the typical cases is due to the adenoid vegetations causing a mechanical impediment to the communication of the lymph channels of the naso-pharynx with those of the brain. In the former cases Lange obtained good results by continued administration of arsenic and proper psychical treatment. He recommends the education of such children in intelligently conducted institutions. MÜLLER.

### *b.*—THERAPEUTICS OF DISEASES OF THE NOSE.

61. FORSELLES, Dr. ARTHUR. On tamponade of the nose in severe epistaxis. *Monatschr. f. Ohrenheilk.*, No. 2, 1897.

62. BRUCK, Dr. F. On the treatment of genuine ozæna. *Berl. Klin. Wochenschr.*, No. 3, 1897.

63. SAENGER, Dr. M. On the treatment of ozæna. *Berl. Klin. Wochenschr.*, No. 3, 1897.

64. RÉTHI, Dr. L., Vienna. The healing of ozæna by electrolysis. *Wien. Klin. Rundschau*, No. 10, 1897.

65. SHASTID, THOMAS H. Eucaine in atrophic rhinitis. *Medical Record*, April 10, 1897.

61. FORSELLES considers the posterior tamponade necessary in cases of severe epistaxis from the middle and posterior portions of the nose, and uses a tampon of iodoform gauze, which must not project from the channel into the naso-pharynx. Styptics, especially perchloride of iron, are to be discarded. KILLIAN.

62. BRUCK confirms the favorable results of the tamponade according to Gottstein's method. But he is against the method of Saenger and Kafemann recently devised, which aims to increase the intensity of the respiratory changes of air pressure and thus the circulation and secretion of the mucous membrane, either by alternating closure of the nostrils with cotton or by artificial stenosis of the nostrils by an apparatus. In Bruck's opinion the tamponade acts as drainage, and by mechanical irritation, which in Saenger's method is limited to a small area of the atrophic mucous membrane. There is no drainage if an apparatus is employed. Gottstein's tamponade is also a useful symptomatic procedure in other fetid suppurations of the nose, *e. g.*, in empyema of the accessory cavities. Bruck modified Gottstein's method by applying a strip of gauze directly to the whole mucous membrane of *both* sides in such a way that *nasal* breathing is not interfered with. If the gauze is soaked with secretion it may be renewed by the patient. The gauze stimulates and absorbs the secretion, at the same time heating, purifying, and moistening the inspired air. In more severe cases Bruck combines it with Gottstein's method. It must be used continuously in order to avoid relapses. MUELLER.

63. SAENGER attributes the unfavorable results obtained by Bruck with Saenger's nasal obturator to lack of technique, and disputes the assertion of Bruck that his method acts only by mechanical irritation. From physical laws Bruck's statement is wrong that the inspired air becomes heated by passing through the gauze as used by Bruck. MUELLER.

64. RÉTHI saw very good results from electrolysis in the treatment of ozæna, which acts almost as a specific. From this he concludes that ozæna has to be considered as a trophoneurosis. POLLAK.

65. SHASTID claims that by applying freely every day a five-per cent. solution of eucaine, the mucous membrane in atrophic rhinitis becomes fuller and more vascular. M. TOEPLITZ.

### *c.*—NASAL SEPTUM.

66. LACROIX. Spontaneous readjustment of the septum by simply removing obstructions of the other nasal cavity. *Arch. internat. de laryng. d'otol.*, x., 1.

67. MCCASSY, J. H. Deformities of the nasal septum. *Journ. Amer. Med. Assoc.*, Feb. 6, 1897.

68. GOUGUENHEIM. On abscesses of the nasal septum. *Ann. des mal. de l'or. du laryng.*, Jan., 1897.

69. DANZIGER, Dr. FRITZ, Beuthen. The so-called idiopathic perichondritis of the nasal septum (spontaneous hæmatoma). *Monatschr. f. Ohrenheilk.*, No. 1, 1897.

70. TURNER, LOGAN. Specimen of papilloma of septum nasi. *Proceedings of the Laryngological Society of London*, Dec. 9, 1896.

71. GRIFFIN, E. HARRISON. Deformities of the nasal septum. *New York Med. Jour.*, June 12, 1897.

72. BUTTS HOYLE, H. An operation for the correction of external and internal deformities of the nose. *New York Med. Jour.*, May 22, 1897.

73. ANDERSON, P. L. A modification of Bosworth's nasal and aural snare. *Journ. Amer. Med. Assoc.*, April 10, 1897.

74. MILLER, VICTOR. Ozæna. Necrosis of nasal septum. Ethmoiditis, etc. Brain complication. Death. *British Med. Jour.*, April 10, 1897.

66. Both nasal cavities of a patient were almost totally impermeable; the left by a globular bulging of the septum, the right by a spina and numerous mucous polypi. After removal of the latter, the left side became also permeable by spontaneous re-adjustment of the septum. LACROIX thinks that this occurs frequently. ZIMMERMANN.

67. MCCASSY removes a stellate portion of the septum and holds the fragments together by a clamp tightened by screws. M. TOEPLITZ.

69. DANZIGER does not believe in the occurrence of primary perichondritis of the nasal septum. It is due either to influenza or to a nasal affection which may lead to an infection of excoriated points of the septum. KILLIAN.

70. LOGAN TURNER showed macroscopical and microscopical preparations of a tumor removed from the right nasal fossa. A man, aged fifty-two years, complained of complete obstruction of both nostrils, a protrusion from right nostril, and a swelling of right side of nose and adjacent cheek. History of three years. Tumor, removed by Annandale by an external incision, measured $6\frac{1}{2}$ *inches in circumference.* Sections showed it to be a papilloma, consisting of a branching connective-tissue framework, containing blood-vessels, and covered everywhere with many layers of epithelial cells, distinctly demarcated from the stroma; here and there the epithelium showed evidence of invading the subjacent fibrous stroma. ARTHUR CHEATLE.

71. GRIFFIN classifies the deflections into those of the superior, middle, and inferior meatus, and into cartilaginous deviations. In 250 successive nasal and throat cases he found 192 deflections, 133 in males and 59 in females; 86 toward the right and 78 toward the left side; 28 sigmoid, and 49 due to an injury. In 2 cases the deflections were found in children of five and six years respectively. Thirteen patients only complained of stenosis, and 27 of symptoms bearing directly upon the deflection; the remaining patients exhibited indirect symptoms. Deflections were most frequently found between the twentieth and thirtieth year of age with 73 cases, and next in frequency was the decade above with 42, and the ages below with 40 cases. The lower horizontal division was affected in 124 cases, the superior in 16 cases. The middle turbinate was impinged upon in 26; both inferior and middle in 29 cases; the superior meatus in 2 cases. For operation the saw and knife were preferred. M. TOEPLITZ.

72. BUTTS clearly describes the operation devised by Ash and depicts the instruments used. In cases of deflection with unsightly external deformity and outer twist of the nasal tip, he supplements the Ash operation by an incision with a bistoury along the length of the upper two fragments at their juncture with the nasal dorsum. In these cases only he places a small tube into the side opposite to the deflection. M. TOEPLITZ.

73. ANDERSON places into the long canula a flexible stilette with an eye for the reception of a double thread of piano wire at one end while the other end terminates in a circular hook, which is placed around a screw-post upon the upper finger ring.

M. TOEPLITZ.

74. MILLER'S patient was a boy, aged eighteen years, who,

while suffering from ozæna, suddenly became unconscious, and was convulsed for one hour. After a second fit he became blind. The sphenoidal sinus was opened by Grünwald's and Schäffer's method. The patient died after a third fit, becoming unconscious, with facial paralysis and divergent strabismus.

*d.*—FOREIGN BODIES IN THE NOSE.

75. McBRIDE, P. Case of foreign body (rhinolith) in nose. *Proceedings of the Laryngological Society of London*, Dec. 9, 1896.

76. HILL, WM. Case of rhinolith and rhinitis caseosa. *Proceedings of the Laryngological Society of London*, March 10, 1897.

77. FALKES, H. M. Worms in the nostrils. *Medical Record*, May 8, 1897.

78. ROTHENAICHER, Dr., Passau. Removal of a rhinolith which had formed around a cherry stone. *Monatschr. f. Ohrenheilk.*, No. 2, 1897.

79. HERZFELD, J., Berlin. On a rhinolith consisting of sulphide of iron, with remarks on the formation of sulphuretted hydrogen in the nose. *Monatschr. f. Ohrenheilk.*, No. 2, 1897.

75. A lady, aged thirty-two, came to McBRIDE, complaining of a discomfort in right nostril. On examination a whitish-brown mass with a sharp edge was seen, feeling hard to the probe. The mass pulled forward with a blunt hook, but its size necessitated breaking before extraction could be effected. The main mass measured 1½ x 1 x 1 inches, and was found to be a rhinolith. Something had been felt in nose for ten years. At eleven years of age, history of smelling nasal discharge. Bad breath all her life. The mass was slightly fœtid, but there was absence of all purulent secretion. ARTHUR CHEATLE.

76. HILL'S patient, a female, aged forty-two years, had complained of right nasal obstruction, fœtor; headache, and deafness of the right ear. The cavity was filled with a putty-like mass; on removing this mass, the septum was found perforated, and the nasal antral wall and inferior turbinal were absent; the caseous matter extending into the antrum. The floor of the inferior meatus was occupied by a hard body, which was found to be a rhinolith. ARTHUR CHEATLE.

77. FOLKES removed from the right nostril of a negro, aged twenty-four, complaining of nose bleed and pains in the head, 78 live screw worms, as large as a pecan, with a forceps, and

after spraying with an alcoholic solution of chloroform, 53 dead ones; altogether 131, none under 10 millim. in length.

M. TOEPLITZ.

78. Removed with a probe curved like a hook.

KILLIAN.

79. The patient was stabbed with a knife at the inner angle of the eye ten years ago. The point of the blade broke and remained in the wound, which healed, without the patient knowing it. The subsequent suppuration in the nose produced $H_2S$, which, with the blade, formed sulphide of iron.

HERZFELD made experiments on the formation of $H_2S$ in the nose by introducing a tampon of cotton infiltrated with acetate of lead. If there is pus, especially from the accessory cavities (not in genuine ozæna), the tampon turns black within a few hours.

KILLIAN.

### *e.*—NEW FORMATIONS IN THE NOSE.

80. SILVER, D. R. Fibrous nasal polypus. *Jour. Amer. Med. Assoc.*, Feb. 20, 1897.

81. LONG, F. A. A large fibrous nasal polypus. *Jour. Amer. Med. Assoc.*, Jan. 16, 1897.

82. JONES, MACNAUGHTON. Esthiomenic menstrual ulcer of nose. *The Medical Press*, June 2, 1897.

83. MCNAMARA, J. Enuresis nocturna. Removal of nasal polypus. Recovery. *British Med. Jour.*, March 27, 1897.

84. LACK, H. LAMBERT. Nasal sarcoma. Cure after operation two years ago. *Proceedings of the Laryngological Society of London*, March 10, 1897.

80. A boy, twelve years old, presented a tumor in the naso-pharynx of the size of a man's thumb, extending below the soft palate. It was removed by means of a string of heavy double silver wire pulled through the nostril and mouth by means of thread carried through a small catheter. It had three lobes, was hard and fibrous, and measured $2\frac{3}{4}$ x $1\frac{1}{2}$ x $3\frac{1}{4}$ inches. From the point of attachment, which is not given, a large mucous polypus sprung up in a few weeks. M. TOEPLITZ.

81. A young, robust German-American farmer presented total nasal obstruction, with frog face. The left nostril contained a solid mass, which pressed the septum to the right and bulged the soft palate downward. The naso-pharynx was filled anteriorly

by a solid mass with uncertain attachment. When removed with polypus forceps through anterior nares, it was soft with slender pedicle, two-lobed, measuring $1\frac{1}{4}$ x $2\frac{3}{4}$ x $\frac{5}{8}$ inches in the nasal, $1\frac{1}{8}$ x $\frac{7}{8}$ inches in the naso-pharyngeal lobe; the pedicle was $\frac{7}{8}$ inch long, had probably originated from the sphenoid cavity, and occluded the right nasal cavity posteriorly. M. TOEPLITZ.

82. At a meeting of the British Laryngological, Rhinological, and Otological Association, held April 30, 1897, MACNAUGHTON JONES read the notes of a case in which an ulcer at one time involved the margin of the nose including the column, and the skin as far as the mucous membrane of the lip; there being marked exacerbations at every menstrual period. A cure, with very slight contraction, was obtained by removing sloughs, application of fuming nitric acid and solid nitrate of mercury, and later, zinc paste, with light applications of salactol to soften crusts, and a wash and cotton plug of solution of chinosal 1-600. Microscopical and bacteriological examination of portions of the tissue failed to elucidate the nature of the disease. ARTHUR CHEATLE.

83. A man having suffered from nocturnal incontinence for twenty years was cured a night or two after having a nasal polypus removed by MCNAMARA. ARTHUR CHEATLE.

84. The patient, a man, sixty-five years of age, was seen by LACK in April, 1895, when the right nostril was almost blocked by a soft, easily-bleeding, superficially necrotic mass, springing from the region of the middle turbinal. In May, 1895, the mass was thoroughly removed, the right ala nasi being detached to permit freer access. Now, nearly two years later, there is no sign of recurrence. Microscopical examination showed undoubted sarcoma. ARTHUR CHEATLE.

### *f.*—AFFECTIONS OF THE ACCESSORY CAVITIES.

85. AVELLIS, Frankfurt a/M. The acute empyema of the antrum and its spontaneous recovery. *Arch. f. Laryng.*, iv., 2.

86. BRONNER, ADOLPH. Empyema of maxillary sinus. *British Med. Jour.*, Feb. 13, 1897.

87. WILKIN, G. C. A case of frontal sinus disease. *British Med. Jour.*, Feb. 13, 1897.

88. BOTEY. Treatment of chronic frontal sinusitis and consecutive intracranial lesions. *Revue hebdom. di laryng., d'otol.*, Nos. 3 and 4, 1897.

89. TILLEY, H. Remarks on the operative treatment of a case of double frontal sinus empyema complicated by double antral suppuration. *British Med. Jour.*, Jan. 23, 1897.

90. HAJEK, M. On the pathological changes of the ethmoidal bones following inflammatory hypertrophy of the mucous membrane and nasal polypi. *Arch. f. Laryng.*, iv., 3.

91. MACKENZIE, JOHN N. The pathological anatomy of ethmoid disease. *New York Med. Jour.*, Jan. 23, 1897.

92. FRASER. Purulent meningitis with cerebellar abscess. *Glasgow Pathological and Clinical Society*, Feb. 8, 1897.

93. BOND, J. W. Mucocele of left frontal sinus. *Proceedings of the Laryngological Society of London*, March 10, 1897.

94. SILCOCK, A. QUARRY. Distension of mucus and empyema of the frontal sinus, with illustrative cases. *Practitioner*, March, 1897.

95. BENNETT, F. W. Case of frontal sinus suppuration. *Proceedings of the Laryngological Society of London*, Feb. 10, 1897.

96. SPENCER, W. G. Hypertrophic pharyngitis and tonsillitis, with chronic enlargement of parotids and submaxillary glands. *Proceedings of the Laryngological Society of London*, Feb. 10, 1897.

97. TILLEY, HERBERT. An investigation of the frontal sinuses in one hundred and twenty-six skulls from a surgical aspect, with cases illustrating methods of treatment of disease in this situation. *Lancet*, Sept. 26, 1896.

85. From the observations of ten acute empyemata of the maxillary antrum, AVELLIS reached the following conclusions:

1. Acute empyema of the maxillary sinus is a very frequent disease.

2. It occurs in a light and a severe form.

The *light* cases are characterized by a painful feeling of pressure and tension within the upper maxilla, purulent, sometimes sanguinolent, secretion, which does not appear in the regular type of chronic empyema. The pain increases in bending the head forward, in coughing, and pressing at stool. The secretion does not entirely cease during the night. Soft œdema, sometimes associated with erythema, of the cheeks and eyelids is frequent. Very rarely supraorbital pain. Generally no offensive odor, but sometimes.

The *severe* cases exhibit all symptoms of the light cases, with

addition of pretty high fever, feeling of severe illness, abundant secretion, nausea, vomiting, aprosexia, and psychical alteration of the patients, who are not able to be out of bed.

3. Acute empyemata are likely to relapse. A common coryza may start a relapse.

4. Bilateral empyema is as frequent as monolateral.

5. Only in one out of ten cases it became chronic.

6. All the light cases recover spontaneously. Only when severe symptoms set in, and if not healed after three weeks, Avellis advocates opening and irrigation of the diseased antrum.

ZARNIKO.

86. BRONNER records a case in which parosmia was the only symptom of maxillary empyema. He draws attention to the frequency of the disease after influenza.

ARTHUR CHEATLE.

87. WILKIN'S patient had suffered with nasal discharge for five years. After polypi had been removed, pus was clearly seen to flow from the infundibulum. On trephining the sinus, three small mucous polypi were found imbedded in web-like granulation tissue. After thorough scraping a drainage-tube was inserted, and removed on the eighth day, when healing soon took place. ARTHUR CHEATLE.

88. Three carefully observed cases. Case 1. Purulent discharge from left nostril for two years, empyema of the supramaxilla antrum, the anterior ethmoidal cells and the frontal sinus. Wide opening of the latter, with careful scraping of all recesses, tamponade through the anterior ethmoidal cells towards the nose; primary closure of the external wound. The tampon was removed on the eighth day, and aristol with boric acid insufflated. Complete and lasting cessation of the suppuration after six weeks.

Case 2 was less favorable, on account of meningeal symptoms existing before the operation. Both frontal sinuses filled with pus and granulations; perforation of the posterior wall of one of them towards the cranial cavity. Meninges and brain infected, probably from previous careless probing. The details of the interesting and long clinical history (fifteen pages) must be read in the original. Death after two and a half months. Tuberculosis could be excluded. BOTEY thinks that there was osteomyelitis due to bacillus pyogenes aureus. Autopsy not permitted.

In the third case, which, like the second, was not exactly chronic, there was a perforation of the posterior upper wall,

which had led to a subdural abscess. Dura covered with granulations, softened and adherent to the brain. Cerebral punctures, after incision of the dura, did not reveal a further focus of suppuration. Tamponade; the wound left open. Second operation two months later, after the perforation in the wall of the frontal sinus towards the brain was closed by scar-tissue (the frontal sinus, however, still discharging). A wide opening was made in the middle nasal meatus, and the external wound closed according to Koenig's method of transplanting bone. Complete recovery after two months. ZIMMERMANN.

89. TILLEY'S case was that of a man, aged thirty-eight years, who suffered with constant purulent nasal discharge and polypi. At the age of eight years he received a blow on the forehead, followed by a discharge from the nose. At eighteen years of age he suffered with violent frontal headache and fever, a large abscess forming over the lower part of forehead. This abscess, after being opened, closed externally, but a purulent nasal discharge remained and continued. Granulation and polypi were present in the middle meatus on each side; these were removed. Both antra were opened and washed out, and the frontal sinuses opened in the middle line by a median incision put above the nose, freely scraped out, and drained through the nose. Recovery, wtih slight antral discharge. ARTHUR CHEATLE.

90. After describing necrosing ethmoiditis (Woakes), HAJEK reports histological investigations on changes of the ethmoidal bones in inflammations of their lining membranes. Normally there is an intimate connection between the mucous membrane and the medullary tissue of the bone. A net of bone with wide meshes, as it were, separates the two lamellæ of the mucous membrane, which form a continuous tissue with the meshes, *i. e.*, the medullary tissue within them. Thus it will be readily conceived that the bone always shows changes in deep-seated inflammations of the mucous membrane. The inflammatory infiltration reaches, by continuity, the medullary spaces which represent the interior lining of the bony lamellæ. The bone reacts either by new formation of bony substance or it decays, generally by both, so that the result is either increase or decrease of the bone substance. This is by no means to be termed ethmoiditis necrotica (Woakes).

The author thinks, differing from his former views, that necrosis of the nasal bones may occur without being due to lues or tuberculosis. ZARNIKO.

91. The diseased structures of the ethmoid removed after preliminary snaring off the anterior end of the middle turbinated body with cutting forceps and curettes, were microscopically examined by SIMON FLEXNER, and revealed that 1, the so-called myxomatous degeneration was due to simple inflammation; 2, purulent ethmoiditis does not necessarily produce osseous necrosis; 3, the changes described afford a field for the study of the development of nasal polypi; 4, the young granulation tissue resembles round-cell sarcoma. Suppuration is incidental and of secondary importance. M. TOEPLITZ.

92. FRASER'S case was a boy, aged twelve years, who died of meningitis and cerebellar abscess. The middle ears were normal. The nasal mucous membrane was found ulcerated. A foul nasal discharge had been noticed before death. ARTHUR CHEATLE.

93. BOND'S patient was a female, who had a swelling in the left frontal region for some years, with much pain on stooping forwards, and pain in left side of nose and left eye. There was tenderness on pressure, and some pitting and redness where the swelling was most prominent. History of a blow. On opening the sinus, thick mucus was found, and the nasal passage blocked. The passage having been made patent, the crown of bone removed by the trephine was replaced, and the wound stitched up. Complete cure without deformity. ARTHUR CHEATLE.

94. SILCOCK opens the floor of the sinus by means of an incision 1 inch in length below and under cover of the eyebrow. Care is taken to establish thorough drainage through the infundibulum. ARTHUR CHEATLE.

95. BENNETT showed a woman, aged thirty-nine, who, after influenza in the early part of 1894, suffered severely with right frontal pain and nasal discharge. In October, 1894, she came to the hospital, with an abscess the size of a walnut over the right frontal region, and a smaller one under the right eyebrow; a polypus was present in the right nostril, and the anterior end of the middle turbinal was considerably enlarged. The nose was cleared of the polypus and anterior end of the turbinal, and the bone was cautiously clipped away from the neighborhood of the infundibulum. After a few weeks the pus was so much diminished that an external operation was postponed, the patient doing so well under the use of a cleansing spray and occasional removal of granulation tissue. The openings in the bone on the exterior had become closed with new bony material.

ARTHUR CHEATLE.

96. SPENCER showed a man, aged twenty-five years, who had had some superficial tubercular lesions and various acne patches and blepharitis. For some time after he had a febrile temperature without definite cause. For the last two months he had suffered with inflammation of the pharynx, tonsils, etc., and the parotids and submaxillary glands had become much enlarged and hard, but painless. ARTHUR CHEATLE.

97. As a result of his investigations, TILLEY draws attention to the extreme variability of the sinuses; the almost invariable presence of a complete rupture; the prominence of the superciliary ridges being no guide as to the presence or extent of the sinuses beneath them; and to the variability of the depth of the infundibulum from the anterior surface, and of the direction and patency of the fronto-nasal passage. He discusses symptoms and treatment, advocating a median vertical incision. Three interesting cases are related. The paper is well worthy of careful study. ARTHUR CHEATLE.

### *g.*—OTHER DISEASES OF THE NOSE.

98. THOMAS, THELWALL. Saddle nose in which a celluloid bridge was permanently buried. *British Med. Jour*,. Feb. 6, 1897.

99. STEWART, W. R. H. Case of curious malformation of the nose. *British Med. Jour.*, Feb. 6, 1897.

100. LAUTMANN. Pathogenesis and serotherapy of ozæna atrophicans. *Ann. des mal de l'or., du lar.*, March, 1897.

101. KAYSER, Dr. R., Breslau. On the relation of ozæna to adenoid vegetations. *Wien. Klin. Rundschau*, No. 9, 1897.

102. MCBRIDE, P. A case of rapid destruction of the nose and face. *Proceedings of the Laryngological Society of London*, Dec. 9, 1897.

103. BENNETT, F. W. Case of Leontiasis. *Proceedings of the Laryngological Society of London*, April 14, 1897.

98. A very ingenious piece of nasal surgery was shown by THELWALL THOMAS at a meeting of the Liverpool Medical Institution, January 28, 1897. A patient, aged fifteen years, had lost the nasal bones in childhood from congenital syphilis. Through an incision made on the left side a piece of celluloid modelled like nasal bones, and possessing a well-marked keel on its concave surface, was inserted subcutaneously and pressed into position,

the keel fitting between the nasal processes of the superior maxillæ, the lateral portions resting on these processes. The celluloid had been in position for seven months, and did not appear to cause any irritation. The personal appearance of the patient was greatly improved. ARTHUR CHEATLE.

99. At a meeting of the North London Medical and Chirurgical Society, held on January 21, 1897, STEWART showed a man, aged twenty-three, on whom he had performed a plastic operation for a broad and deep groove in the middle line of the nose, running from the lower end of the nasal bones downwards between the lateral nasal cartilages. The organ thus presenting two well marked tips. Along the floor of the groove was a scar, due to the removal of a tumor (in all probability a dermoid) in infancy. At the operation the anterior margin of the septal cartilage was found abnormally broad. ARTHUR CHEATLE.

100. LAUTMANN considers ozæna as a trophoneurosis. The bacillus mucosus and the pseudo-diphtheria bacillus infest the mucous membrane secondarily when it is changed by inflammation. The injections of antidiphtheria serum helped in so far as they removed the offensive odors. ZIMMERMANN.

101. According to KAYSER, ozæna and adenoid vegetations exclude each other. The antagonism is due to constitutional causes. POLLAK.

102. A curious case related by MCBRIDE. A man, aged twenty-eight, scratched his nose on the inside of left ala with his finger in December, 1895. This became itchy and sore; in a week the skin began to swell. During January, 1896, the left side of nose and cheek became swollen and painful, and there was some discharge from the nostril. An ulcer was seen on the inner side of the left ala, about as large as a sixpence, covered with a dirty, white slough. Iodine given; but in March he was so much worse that he was taken into hospital. The case then presented the following features: an erysipelatous-looking swelling of the left ala, cheek, and lower eyelid, a pustule beginning to form on the exterior of left ala; much pus, partly inspissated, within the nostril, and bare bone in the region of the middle turbinal. The pustule gradually became a fistula, and from this gradual destruction of surrounding parts followed. Mercury inuncted without effect. Inoculation of guinea-pig by Milligan gave negative result, the animal presenting no evidence of disease when killed after five weeks. Destructive agents of various

kinds then employed, also without benefit. The temperature at first showed great rises, associated with marked œdema of face and eyelids, which at first lasted a few days and then disappeared. Towards the close of the case, the temperature more constantly up, but with marked fluctuations. In July, 1895, Dr. Unna saw the case, and suggested malignant tertiary syphilis or glanders. Bacteriological examination by Fortune showed numerous cocci and bacilli. The ulceration continuing in spite of everything, the patient died on September 18, 1896. Post-mortem—the destruction of the face found to be very extensive, the bone being exposed from *malar* to *malar*, while the whole external nose and most of the upper lip were destroyed. Sections from margins of the ulcer did not clear up the case. Marked endoarteritis was present, pointing to tertiary syphilis, but Muir was strongly of opinion that the disease did not correspond to any known type. The patient was a house painter by trade. No history of syphilis. Patient never had anything to do with horses.

ARTHUR CHEATLE.

103. A middle-aged man came to BENNETT on account of lachrymal obstruction on the left side. The nasal bones were much enlarged. The floor of the nose and the lateral wall much hypertrophied with bony thickenings. The condition had lasted for fifteen years. ARTHUR CHEATLE.

## NASO-PHARYNX.

104. SCHWENDT, Dr. A. A case of congenital bilateral osseous atresia of the choanal. Healed by the galvano-cautery. *Monatschrift f. Ohrenheilk.*, No. 3, 1897.

105. BOENNINGHAUS, Dr., Breslau. Obstruction of the choanae through swelling of the folds of the tubal ostia. *Monatschr. f. Ohrenheilk.*, No. 3, 1897.

106. Exotosis of the pharyngeal vault accidentally removed together with adenoid vegetations. *Arch. internat. de laryng. d'otol.*, x., 1.

107. DE ROALDES, A. W. Fibro-chondroma of branchial origin (pharyngeal teratoma). *New York Med. Jour.*, Feb. 6, 1897.

108. SCHMIEGELOW, E., Copenhagen. A case of primary fatal hemorrhage after removal of adenoid vegetations. *Monatschr. f. Ohrenheilk.*, No. 3, 1897.

109. PLUDER and FISCHER. On primary latent tuberculosis of the hyperplastic pharyngeal tonsil. *Arch. f. Laryngol.*, iv., 3.

110. KUH, EDWIN J. Primary cancer of the naso-pharynx cured by injections of alcohol. *Med. Record*, April 17, 1897.

111. CONCANON, JAMES T. On retronasal adenoids and their removal with a new instrument. *New York Med. Jour.*, June, 12, 1897.

104. Both nasal cavities had the shape of a funnel with the apex at the floor of the lower meatus. All turbinated bodies were atrophied. The probe felt a bony resistance behind. Vault of the palate very high, its osseous portion unusually short. The atresia was in the choanae. Treated with galvano-cautery in several sittings; afterwards introduction of canula of silver by the patient herself. The inclination to return was great. Sense of smell abolished at first, even after the operation; recurred later on. KILLIAN.

105. BOENNINGHAUS observed in this remarkable case how the mucous membrane surrounding the tubal orifices swelled, forming two smooth, red tumors, which almost closed the naso-pharynx, the choanae and touched each other in the median line. Application of cocaine caused a decrease of the swelling, so that free nasal breathing was possible. The tumors were destroyed with the galvano-cautery. Apparently the mucous membrane of the tubes consisted of cavernous tissue, like the lower turbinated bodies. KILLIAN.

106. In a girl, aged eleven, adenoid vegetations, during removal with the pharyngo-tonsillotome of Schuetz, offered a considerable resistance, so that the instrument was bent (with crepitation). This was due to a triangular piece of bone, which came away with the vegetations, and was 1 *cm* long, $\frac{1}{2}$ *cm* wide. It consisted of spongy bone, no cartilage or fibrous tissue, and was taken by LICHTWITZ for an exostosis of the tuberculum pharyngeum. Lichtwitz observes briefly the observations of Zuckerkandl, Scheff, Helme, and Roth in regard to this subject. ZIMMERMANN.

107. The tumor was observed, in a boy, six weeks old, to emerge in crying from the naso-pharyngeal cavity, to fall gradually down as far as the vestibule of the larynx, then, after coughing, to recede to the naso-pharynx or to place itself on the dorsum of the tongue, and finally, by rotating around its attachment upon the left side of the bucco-pharyngeal cavity, to reach the alveolar

border of the superior maxilla. The naso-pharynx was comparatively free. After its evulsion with the pedicle, which was implanted to the middle part of the posterior pillar, it presented the appearance of an auricle (1 x 1½ inch), covered with epidermis, corium, cartilage, etc. According to ACHARD'S examination in Lannelongue's laboratory, it was made up of connective tissue and some adipose tissue. The cartilage is reticulated, or elastic fibrous. The tumor approaches the branchial fibro-chondromata in the buccal cavity, with the distinction that the integument is cutaneous instead of mucous, and it is a simple expression of an "epignath monster." J. Bland Sutton considers it a dermoid tumor, or teratoma of the pharynx; the shape is accidental.

M. TOEPLITZ.

108. By faulty and apparently forcible application of Gottstein's annular knife, the lateral wall of the naso-pharynx was lacerated, and also, in a manner scarcely to be explained, the internal carotid were injured before its entrance into the carotid canal of the petrous bone, leading to a directly fatal hemorrhage. The patient was a boy of twelve years, who did not resist during the operation. The operator had performed the same operation several times previously, as SCHMIEGELOW states.

KILLIAN.

109. At the instance of the communications of Lermoyez and Dienlafoy, PLUDER and FISCHER examined thirty-two pharyngeal tonsils in regard to tubercular affections. They found in five more or less numerous typical, partly cheesy tubercles, which contained bacilli only in the lymphatic glandular tissue. No ulceration. Bacilli were never found in the nasal mucus. The diagnosis could be made only from microscopic sections. The diseased parts did not present any microscopic peculiarities.

The tubercular pieces belonged to individuals aged from three to twenty-six years, of whom only few gave a family history of tuberculosis, more presented the aspect of marked scrofula. The authors are convinced that the infection was brought about by inhalation, and believe that in many cases the affection remains localized, but becomes rather serious on account of the imminent danger of spreading (by inspiration, by the lymphatics and the blood-vessels).

Therefore they advise radical removal of the adenoid vegetations by skilful hands. The clinical remarks are by Pluder, the histological by Fischer. ZARNIKO.

110. KUH'S patient, aged thirty-seven, suffered, apart from an old atrophic rhinitis, from gradually increasing obstructions of the left nostril and from epistaxis. The naso-pharynx was occluded by a tumor, growing from the vault, which was softer on the right, and globular and hard on the left side. Owing to the diagnosis of the enlarged pharyngeal tonsils the growth was removed, but returned within a month. Microscopically, an epithelial cancer was found, which was confirmed by Nicholas Leun. Injections with erysipelas-prodigiosus toxines (Coley) at first decreased, but after fourteen injections increased the growth. Injections with absolute alcohol, according to C. Schwalbe and O. Hasse, beginning with 3 and increasing to 30 minims, reduced the tumor after the seventh, and after the nineteenth injection the naso-pharynx was in four months found to be entirely free.

M. TOEPLITZ.

111. A thin plate of spring steel with rounded edges, bent at right angles, is attached to the lock of the forceps, reaching to the tip and covering the open jaws. Its vertical part has a depression, which fits over the septum, protecting the latter against the open blades. The latter are fenestrated, and cutting as in the Gradle forceps, CONCANON claims that this instrument may remove the adenoids, particularly those near the septum, with one application under cocaine. M. TOEPLITZ.

## VELUM, PHARYNX, AND ORAL CAVITY.

112. HAJEK, Dr. M., Vienna. Operation for adhesions between the soft palate and the posterior wall of the pharynx. Preservation of the artificial communication. *Allgem. Wien. medic. Zeitung.*, No. 1, 1897.

113. LOGUCKI, A., Warschau. A contribution to the etiology of the peritonsillar abscess. *Arch. f. Laryng.*, iv., 2.

114. SEMON, FELIX. Case of black tongue. *Proceedings of the Laryngological Society of London*, Jan. 13, 1897.

115. BENNETT, H. W. Case of tumor of the uvula. *Proceedings of the Laryngological Society of London*, Feb. 10, 1897.

116. BOND, J. W. Case of thickening of hard palate. *Proceedings of the Laryngological Society of London*, Dec. 9, 1896.

117. MCBRIDE, P. Pulsating vessels in the pharynx. *Edinburgh Med. Jour.*, Dec., 1896.

118. NEWCOMB, JAMES E. Anatomical defects in the faucial pillars. *The Laryngoscope*, April, 1897.

112. Methodical dilatation of the stricture with an instrument similar to the nasal speculum of B. Fraenkel. Linear adhesions of the soft palate are detached in one sitting, adhesions of the whole surfaces in several sittings. POLLAK.

113. From eleven cases of peritonsillar abscess examined bacteriologically and a number of clinical observations, LOGUCKI reached the following conclusions: Peritonsillar abscess is a secondary affection, generally after recurrent acute tonsillitis, sometimes after diphtheria. Adhesions between the tonsil and the faucial pillars give a predisposition to it. If the abscess is opened in the first few days, chiefly streptococci are found, later also staphylococci, finally staphylococci alone. Probably the staphylococci exceed the streptococci, and contribute to a favorable issue of the affection by replacing them. ZARNIKO.

114. SEMON showed a patient, aged forty, who had had a large patch of enormously elongated hairy-like, inky-black papillæ in the region of the papillæ circumvallatæ. Great improvement had occurred under the local use of a five-per. cent. ethereal solution of salicylic acid, mixed with a five-per cent. collodion solution, and followed by an application of peroxide of hydrogen by means of a plug of cotton wool, applied several times a day; a plan of treatment recommended by Dana. ARTHUR CHEATLE.

115. BENNETT showed a simple tumor, the size of a walnut, removed from a child aged six years. It appeared to be confined to the uvula, but digital examination showed that it extended upwards towards the hard palate. The tumor interfered with distinct speech. It was removed by dividing the mucous membrane, and shelling it out except for the strands of tissue which passed up. The exact point of origin could not be determined.
ARTHUR CHEATLE.

116. BOND showed a girl, aged twenty-eight years, who had noticed a swelling at the junction of hard and soft palates and in the middle line for nine months, and which ached "like toothache." Consisted of three wounded divisions, paler on the surface than the surrounding mucous membrane, and tender to the touch. Probably an exostosis. ARTHUR CHEATLE.

117. MCBRIDE records two cases of abnormal arteries running up on each side behind the posterior faucial pillars, a large trunk passing across the posterior pharyngeal wall in one of them.
ARTHUR CHEATLE.

118. NEWCOMB divides the anatomical defects into two classes: one, due to destructive processes, and the other of congenital origin. He collects forty-two cases, including three of his own observation, of which thirty-one only were fully reported. Of these, 25 exhibited defects in one or both anterior pillars, and 6 in one or both posteriors; 13 were anterior bilateral, and 1 posterior bilateral. He then discusses the symptomatology, as much as these cases present, and the mode of origin, referring extensively to the paper on the same subject, published by the reviewer, in these ARCHIVES, vol. xxi., No. 1. M. TOEPLITZ.

# REPORT OF THE PROCEEDINGS OF THE SECTION IN LARYNGOLOGY AND OTOLOGY OF THE SIXTY-FIFTH ANNUAL MEETING OF THE BRITISH MEDICAL ASSOCIATION, AT MONTREAL, SEPTEMBER 1–4, 1897.

By Dr. J. A. SPALDING, Portland, Me.

The opening meeting of this Section was devoted to papers on **Turbinotomy,** by Dr. MacDonald. The main drift of the paper and of the subsequent discussion tending to show that the operation has been overdone on both sides of the Atlantic, and that, except in rare cases, better results can be obtained by milder and particularly less destructive methods of treatment. The complete removal of the inferior turbinates is not practised to the same extent in America as by some distinguished colleagues in England.

Dr. Bryson, of Washington read notes on **The Anatomy of the Fronto-Ethmoidal Region,** containing most valuable results of observations on the anatomy of the infundibulum, which cannot fail to be of interest and value to surgeons operating in that region.

Dr. Fletcher Ingalls introduced the topic of **The Relation of Nasal Diseases to Pulmonary Tuberculosis,** in which he suggested that there was to some degree an antagonism between pulmonary tuberculosis and nasal catarrh. The paper was a valuable contribution to statistical investigation of the question, but the results were not entirely accepted by some of those who discussed the paper.

The second day was occupied with the reading of papers chiefly on **Laryngeal Paralysis,** beginning with one by Dr. Daly, who dealt especially with the ætiology of the same. Dr. Shurly spoke further on the prognosis of such cases, and thought that

structural lesions would be found more often in cases of hysterical paralysis if looked for more carefully and often.

Mr. LENNOX BROWNE spoke about **Hysterical Aphonia**, and the use of the voice in singing.

Dr. BRYSON DELEVAN pointed out the need of further investigations into **Right-Sided Laryngeal Paralysis,** and referred to two unusually persistent cases of diphtheritic paralysis. One case had lasted for three years, and the other for sixteen, with no return of the vocal powers.

Dr. PERMEWEN, of Liverpool, referred to certain observations on the **Condition of the Larynx in General Paralysis of the Insane.** In this condition laryngeal paralysis was very common, that is, abductor or whole-cord paralysis. He held that a very constant diagnostic sign of hysterical paralysis was the absence of all abductor paralysis, and concluded by relating a case of bilateral abductor paralysis due to the pressure upon both recurrent nerves through the action of an aneurism.

Dr. MACKENZIE'S paper discussed **The Physiological and Pathological Relations between the Nose and Sexual Apparatus,** and later it was briefly discussed by some of the members.

Dr. ROE, of Rochester, spoke on **The Correction of Nasal Deformities by Subcutaneous Operations,** which contained many valuable and instructive points; and Dr. BRYSON finished the session with a paper on **The Surgical Treatment of Malignant Diseases of the Larynx,** showing many practical points, and urging the necessity of early and radical measures.

**The Operative Exposure of the Middle-Ear Spaces after Detachment of the Auricle, as a Radical Procedure to Cure Old, Chronic, Middle-Ear Suppurations, Caries, Necrosis, and Cholesteatoma of the Temporal Bone.** By Dr. L. STACKE, Erfurt. Published by F. Pietzker, Tübingen, 1897.

Reviewed by Dr. A. HARTMANN, Berlin.

Translated by Dr. ARNOLD H. KNAPP, New York.

This book gives an exhaustive description of the author's radical cure for chronic middle-ear suppuration. Though perhaps one-sided, as only this one method (Stacke's) is discussed, it is nevertheless interesting to read the very accurate manner of procedure, especially for those familiar with the remaining literature on the radical operation.

In the introduction Stacke reiterates his claim to priority in the invention of the radical operation. He deems this necessary, in view of the repeated claims of priority expressed by Zaufal. The zealous attempts of Stacke to assure his priority seem to show that his claims, as far as they concern the radical operation in general, are not too well founded. The method which commences in the attic after detachment of the auricle and ends in the antrum belongs unquestionably to Stacke, but the method of chiselling from the outer side of the mastoid, and after exposure of antrum, laying the latter and the attic bare was recommended and performed before Stacke. The reviewer begs to draw attention to his former papers on this subject in these ARCHIVES.[1]

Stacke's attempt to establish his priority by quoting several witnesses on the date of the first operations is unsuccessful. It is

[1] "Historical Remarks on the Exposure of the Attic, the Tympanum, and the Mastoid Antrum." These Archives, vol. xxiv., p. 1.

customary in science to claim priority from the date of the publication.

The reviewer takes it for granted that the majority of otologists do not employ Stacke's method of first entering the attic and then the antrum, but remove the cortex and the posterior wall of the auditory canal to the antrum and then expose the attic. Stacke's method would then be indicated only when, starting from mastoid process, one could not find the antrum. As this is unusually seldom, this procedure would only rarely be employed.

The nasal operation commencing externally is simpler and just as safe as that of Stacke. It is quite true that at the commencement of radical operations the facial nerve was injured a number of times. This can be explained by the insufficient regard for certain anatomical relations, and by the directions of Küster and Zaufal to remove the posterior wall up to the tympanum. The reviewer has often pointed out that the posterior wall should not be completely removed, *i. e.*, including the inner edge, as has been shown by his drawings, the facial canal then could not be excluded. The reviewer has always insisted that the antrum must first be exposed, and then the anterior lower wall of the same, and the outer wall of the attic should be removed. In this method the facial canal is not injured, and in the present radical operations this accident no longer appears.

In regard to cholesteatoma, Stacke agrees with Zaufal that the entire lining wall of the cavity must be removed to insure safety against recurrence. This opinion will not be shared by all otologists. Siebenmann has shown that a cure may take place without this precaution. The reviewer also has observed several cases where the simple radical operation had been performed and no recurrence took place. The complete removal of the lining wall explains the protracted period of after-treatment, notwithstanding the aid of plastic operations. Stacke specially mentions a case where, after an extensive chiselling operation without removal of the lining wall, recurrences repeatedly took place, and a second operation had to be performed to remove the cholesteatomatous membrane and a layer of bone and secure a covering by plastic. Stacke is, however, not able to report the permanent cure; the case only seems to him to be healed. A number of observations are necessary to decide this point. The retro-auricular opening need not be permanent in cases where the lining wall has been preserved, as the permanent exposure of very extensive cavities can be obtained with aid of Körner's flap.

The first step in Stacke's method is the curved incision behind the auricle and the lifting out of the membranous canal according to the manner previously described by him, *i. e.*, the division of the auditory canal as far inward as possible, and the retraction of the canal with aid of a raspatory. The second part of the operation consists in the exposure of the middle-ear spaces. The hammer, if still present, is first removed; then, differing from the other radical operations, the pars epitympanica and the posterior upper wall of the canal is removed until the probe can readily be introduced into the antrum. Then follows the removal of the outer corticalis and the outer part of posterior wall.

The third step is the formation of flaps to cover the osseous defect. Stacke forms a flap by a horizontal incision which divides the upper wall parallel to the axis of the canal, and extends to the concha and a second incision which passes directly up from the outer extremity of the latter. The flaps are pressed against the bony surfaces with tampons. Stacke mentions Panse's flap, which is taken from the posterior wall and is quadrilateral in shape. He considers the only advantage of this flap to be the primary closure of the retro-auricular opening, but doubts with justice whether it be an advantage to conduct the after-treatment through the auditory canal in this case. Stacke does not seem to have tried Körner's flaps. The latter differ principally from Panse's in that the four-cornered flap is partly formed from the concha. In this case it is possibly to close the posterior wound, and the canal is so wide that the after-treatment can take place easily. Körner's flaps have so shortened the healing process and simplified the after-treatment, that after their employment no one would return to keeping open the retro-auricular wound and making use of the Stacke or Panse flap. The theoretical objections which Stacke advances against Körner's flaps, namely disfigurement and difficulty in controlling the granulating process need not be considered in comparison to their advantages.

The after-treatment is the same as after any radical operation. Stacke lays especial weight on the packing of the wound first with small, then with larger strips of gauze. The strictest aseptic precautions are to be observed during the dressings. To control the granulations silver nitrate or the galvano-cautery are employed. The reviewer considers chromic acid to be superior to either of these, on account of the painlessness, the facility of application, and the definite action.

The prognosis of the radical operation is a very favorable one, and the operation may be regarded as without danger. Of Stacke's 100 operated cases, 96 were healed, 3 have died, 2 unfinished, and 1 not improved. The hearing was not impaired in 49 cases, improved in 31, made worse in 6, and no examination was made in 14.

The average course of treatment in the 100 cases was three and one half months.

As far as it was possible for Stacke to learn, recurrence took place in the 100 cases 20 times, namely: 12 recurrences in the skin (superficial discharges), 4 in the bone, 4 on account of general malnutrition. These recurrences were all healed.

In the second part of the book the histories of the 100 cases are briefly detailed.

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ERRATUM.

A serviceable solution of dog-pepsin for injection and the syringe mentioned in Dr. Cohen Kysper's article on the "Treatment of Deafness, etc., by Digestive Ferments," page 158 of this volume, may be obtained from the physiological institute of Dr. Carl Enoch, in Hamburg.

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## Contents of the latest numbers of the Zeitsch. für Ohren.

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1. On cartilaginous interglobular spaces in the human labyrinthine capsule. By Dr. P. Manasse.

2. Studies on the form of the ear. By Dr. Karutz. IV. The form of the ear as a sign of degeneration.

3. Dr. Harris's paper.

4. The determination of one-sided deafness. Six further cases of labyrinthine necrosis. By Professor Bezold.

5. Affections of the ear in leukæmia. By Dr. Schwabach. Report on the progress in Otology during the first quarter of 1897 (concluded). By Dr. Hartmann.

Report on the sixth meeting of the German Otological Society in Dresden, on June 4 and 5, 1897. By Dr. Jens.

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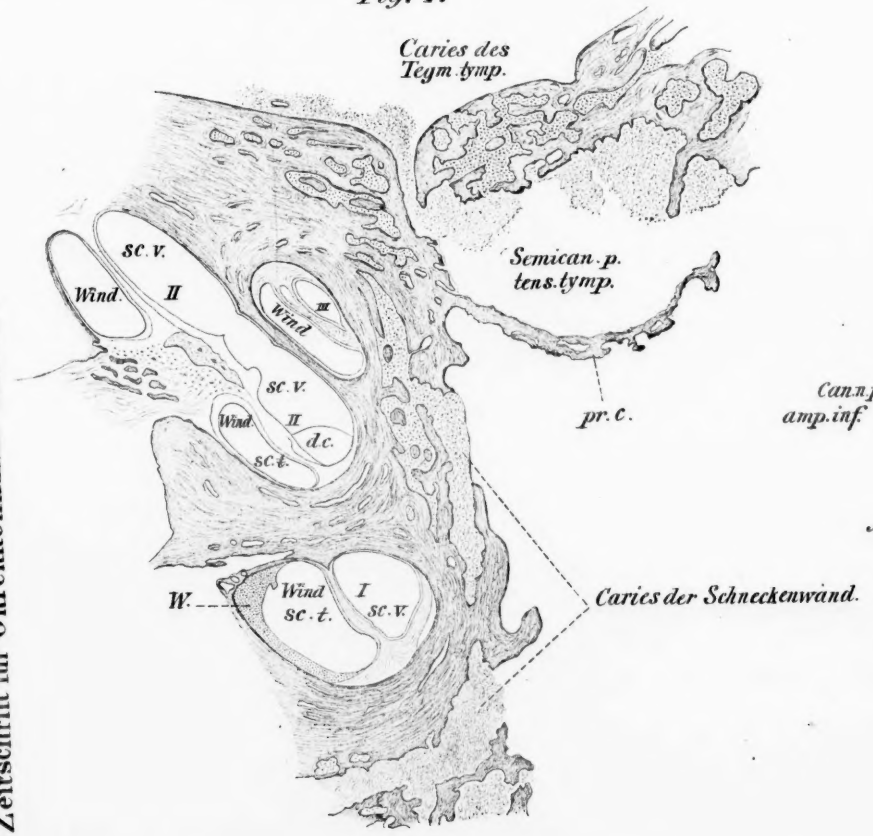
*Fig. 1.*

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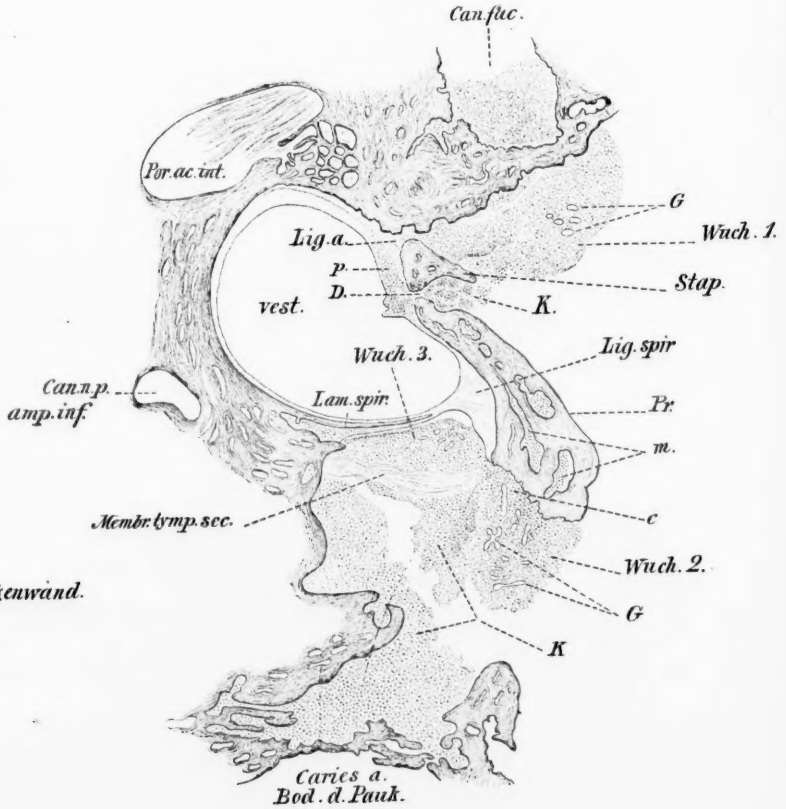


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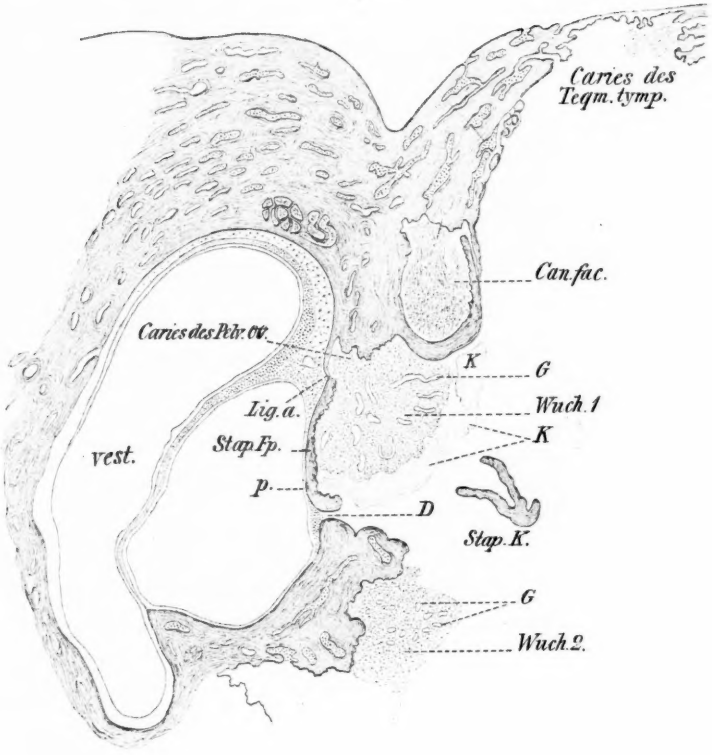


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